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THE ELEMENTS OF
RAILWAY ECONOMICS

BY W. M. ACWORTH

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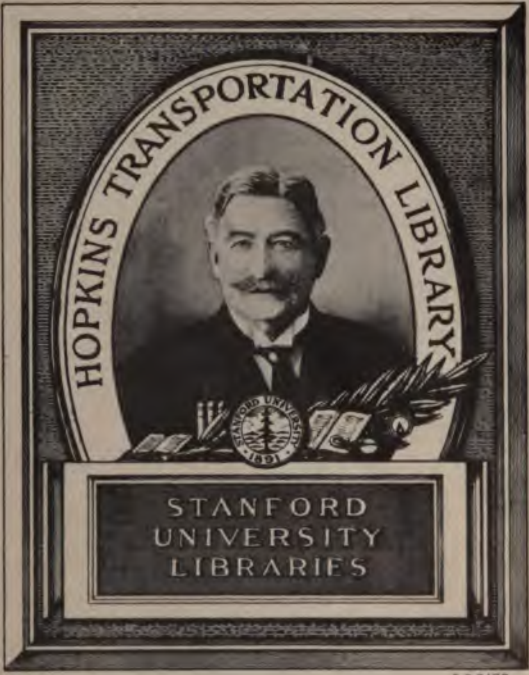

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THE ELEMENTS OF RAILWAY ECONOMICS

BY

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PUBLISHER TO THE UNIVERSITY OF OXFORD
LONDON, EDINBURGH
NEW YORK

PREFACE

For the last nine years, during which I have lectured on Railway Economics at the London School of Economics, I have been constantly hampered by the want of an English text-book of the subject. Having waited long in the hope that some one else would fill the gap, I have in the end reluctantly attempted to fill it myself. Circumstances have, however, prevented me from completing the book which I had planned, and the pages that follow are only an instalment. My apology for publishing an incomplete fragment lies in the hope that to my own students, and perhaps also to the students in classes that have recently been established in Manchester and elsewhere, half a loaf, and that but indifferently baked, may be better than no bread.

I shall be grateful for any correction in matters of fact, or criticism on matters of opinion, that may be sent to me, and trust that the complete work, when published, will benefit by them.

W. M. A.

December, 1904.

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THE ELEMENTS OF RAILWAY ECONOMICS

CHAPTER I

INTRODUCTORY

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raised above the surface and the flange was transferred from the rails to the wheels. The railway thus became specialized; it could only be used by special vehicles, and the special vehicles could no longer be used on ordinary roads. Naturally, the railway forsook the public highway and was laid on land allocated to its sole use.

From the physical point of view we may then define a railway as a road devoted to the exclusive use of vehicles adapted to run on raised rails. But in practice our definition, even on the purely physical side, goes far beyond this. The object of the specialized roadway was to secure economy in cost of haulage, and at a very early period it became evident that economical haulage was inconsistent with the curves and corners and the climbing up and down hill of an ordinary road. And so we have the bridges and viaducts and embankments, the cuttings and tunnels, and all the costly 'works' which belong to our modern idea of a railway.

Now the fact that a railway is a specialized road is in no way inconsistent with its general use by individuals with their own specialized vehicles. A motor or bicycle track is open to any one who brings his own machine and pays the toll demanded. Moreover, canals, a form of specialized road which preceded railways by at least a century, have almost always in every country been free to all users on payment of toll; and even nowadays for canal owners to be also canal carriers is quite exceptional. It was, therefore, not unnaturally assumed when railways first began, not only in England, but in, for instance, France and America, that the canal practice would be followed and private individuals would convey their own traffic along what still remained in law a public highway, though devoted to a special use and constructed—as were also, it may be remembered, the turnpike roads—on land specially acquired in fee simple for the purpose. This assumption underlies the whole of our early railway legislation, and a considerable portion of modern railway legislation and case law is concerned with the efforts of the Legislature and the Courts to harmonize with modern actuality laws conceived in reference to an entirely different state of facts.

Railway law assumes the independent carrier as the normal type. But the legal assumption never had, even in the earliest days, any serious basis of concrete fact. The only justification for the expense of making a railway was economical haulage; and economical haulage implied two things, mechanical power and concentration of load. Mechanical power, fixed to the spot in the shape of self-acting inclines or stationary engines, evidently must be provided by a single owner, more naturally the owner of the railway than a third party. Power in the shape of a locomotive is a wholesale commodity beyond both the means and the requirements of ordinary customers. And accordingly, almost from the outset the owner of the railway has been, with a few exceptions of great antiquarian but no practical interest, the sole provider of tractive force along it.

It still remained theoretically possible that the actual conveyance and the dealing with the public should be in independent hands. A coach proprietor, for instance, might have supplied a vehicle, published his fares, booked his passengers, and then paid to the railway the tolls fixed by Parliament (*a*) for the use of the road, and (*b*) for the provision of locomotive power. But this never in practice happened; carriage of passengers, on English railways at least, has always been done exclusively by the railway companies themselves in vehicles belonging to them[1]. In goods traffic, however, matters did not proceed so fast, nor have they gone quite so far. Till comparatively recent times one great firm of private carriers at least remained as an independent intermediary between the public and the railways, hiring trucks from the company, and loading goods entrusted to them at the one end of the transit and unloading them at the other on their own premises. In the case of mineral traffic, and coal in particular, even now in England, though in no other country, the usual custom is that the trucks belong to and are kept in repair by the private owner. But the trucks when on the railway are in the entire charge of the railway company.

---

[1] On the Continent and in America a large part of the long-distance express traffic is carried in vehicles belonging to private companies—the *Compagnie Internationale des Wagons-Lits* and the Pullman Company respectively. But these two companies run their cars not in the exercise of

This brief sketch of railway development shows two things. It shows in the first place that when we speak of a railway—in such phrases, for instance, as 'The A Railway is one of the best in the country;' or 'State railways are better or worse than private railways'—we refer to an organism performing three distinct and at least theoretically separable functions; namely, (1) owning a road, (2) owning the rolling stock used on the road, (3) carrying for hire traffic of all sorts. We see further that, though precedent seemed against it, though public opinion and positive legal enactment exerted pressure the other way, these three distinct functions have in fact been combined everywhere; and we may therefore assume that their combination has at least some economic justification. Both points are of sufficient importance to require more detailed consideration.

We notice, in the first place, that the combination of

legal rights over a public highway, but merely as agents employed by the railway administrations under a voluntary contract.

the three functions differentiates railways from all other transport undertakings. A canal company or a turnpike trust confined itself to the ownership of the road, while barge-owners and the stage-coach or stage-wagon proprietors confined themselves to owning rolling stock and carrying for hire. Omnibus companies use roads wholly, and tram companies use roads largely provided for them by public taxation; the road used by steamship companies is provided for them by nature. Evidently then railway rates must differ in kind from canal tolls on the one hand, and from omnibus or steamboat fares on the other. Canal tolls are mainly charges for capital provided; omnibus or steamer fares mainly charges for services rendered. A railway rate combines the two, in what proportions we shall see presently. It includes interest on capital already spent and charges for current expenditure on daily and hourly service.

CHAPTER II

RAILWAY CAPITAL

THOUGH the sketch of railway history given in the previous chapter is mainly English—as is but natural seeing that English railway history is not only the oldest and the most typical but also that most familiar to us—it should be noticed that all that has been said so far applies to railways however owned or managed; to the independent undertakings of England and America and the State-subsidized and State-controlled railways of France, equally with the State-owned and State-worked railways of Germany or Australia. Hereafter there will be something to be said as to these different systems of management; for the present we are only concerned with points common to all.

Let us, then, deal first with railway capital. Continuing to use English experience as illustrative only, we find that, in the roundest of round figures, the capital of the railway companies of the United Kingdom is £1 200 000 000. Of this sum roughly £200 000 000 represents nominal additions to capital in recent years; the balance, £1 000 000 000, may be taken as money actually spent. In return the companies possess some 22 000 miles of line; about 800 000 vehicles of various kinds, including 22 000 locomotives; and a vast mass of miscellaneous property, docks, steamboats, hotels, horses and carts, &c. Though the individual companies divide their capital expenditure under these various heads, the expenditure of all of them has never, that I am aware, been so summarized. Roughly, perhaps we may say that the railway proper, the road and the buildings, has cost £800 000 000, the rolling stock £150 000 000, while the remaining £50 000 000 are represented by the miscellaneous property.

The railroad proper has cost, we may say, £800 000 000. The first important item in this great expenditure may be taken as that for preliminary expenses. Long before the construction of a line is actually begun, careful surveys of all possible routes have to be made; then comes a much more careful survey of the route finally decided on; then troops of skilled lawyers and surveyors have to negotiate with all the public authorities and landowners who would be affected by the proposed line; those who cannot be conciliated have to be fought before the tribunal, Parliamentary Committee or other, empowered to sanction the construction of the railway. The outlay is necessarily great—how great no one knows, though a competent authority once estimated it at £4000 per mile, which for all the railways of the United Kingdom would mean a sum of £90 000 000 sterling. But the outlay is unavoidable and, which is more important, represents money sunk once for all and irrecoverable. If the line is never made; if when made it fails to render public service by carrying traffic, the money is as absolutely wasted as though it had been spent on prospecting for gold where no gold existed.

But we are not yet done with preliminary expenses. Land has to be bought and the owners to be paid, not only for the land actually required by the railway, but also for the injury done to the remaining and adjacent land which is cut in half by the railway fences. Land and land-damage must have cost English railway companies even more than preliminary expenses. Once more the expenditure is unavoidable; once more it is irrecoverable.

For, having obtained the land, the first thing the railway does is to ruin it for use for any other purpose than a railway. A flat field has an embankment constructed on it; the slope of a hill has what James Watt called 'a confounded gash' cut through it; what was a building site in a town is excavated many feet below or raised many feet above the level of the adjacent streets[1]. And once more the expenditure on ruining the land for ordinary purposes is sunk for good and all and irrecoverable. If the railway that results from all this expenditure is not useful as a railway, it is useful for nothing else. It represents sheer waste of capital, a well sunk without finding water, a ship built and fitted that will not float. The embankments and cuttings, the tunnels and viaducts, the bridges and platforms, the culverts and ballast, all are fixed to the spot for ever. If the railway is a failure, they can neither serve any other purpose where they are, nor be taken up and employed elsewhere. Even the very buildings are of too special a nature to be adaptable to other uses.

To sum up. The railroads of this country—the roads only, not counting movable property—represent an immobilization of some £800 000 000 of capital[1]. The money has been found on the faith that traffic will be forthcoming in sufficient volume, and ready to pay for carriage sufficient rates, not only to cover actual transport costs of all kinds, but £32 000 000—reckoning at 4 per cent., which is certainly not high when risk is allowed for—of annual interest as well. Notice, further, that the money has been found on the faith and for the use of traffic in general; not for the use of goods specially, still less of any particular class of goods; nor for the use of passengers or any class of them; but for the use of traffic of every class and kind. The proportion of the total capital invested in accommodation devoted exclusively to goods or minerals or passengers is relatively quite small.

---

[1] In the case of a terminus this may not be necessary. It depends on whether the streets outside the terminus are or are not too important for their levels to be sacrificed to the level of the railway. But in the case of a railway going through a town the statement in the text is broadly true.

One thing more we may notice. The road has cost much to provide; it costs comparatively little to maintain. About £10 000 000 sterling per annum keeps in order £800 000 000 worth of railway, including stations and all other buildings. Evidently the proportion of the total capital invested in buildings (which every-day experience shows to be costly to keep in repair) must be but trifling.

A further point of first-rate importance must be noted here. It is a commonplace nowadays to say that the profitableness of a business depends on the possibility of keeping the works fully occupied, the capital fully employed. In the nature of things a railway undertaking can only exceptionally do this. The point can be best illustrated by a specific instance. The West Highland Railway has been recently constructed from Helensburgh on the Clyde to Fort William, a distance of about 100 miles, at a cost of something like £13000 a mile. If the line was to be made at all, the expenditure was necessary. Costly works were unavoidable, deep valleys had to be crossed, mountain torrents to be spanned, granite rock to be cut through, before a practicable railway could be built. If passenger trains were to run at a reasonable speed, a first-class permanent way had to be laid, stations, platforms, and signals had to be provided. If goods were to be carried at all, sidings and sheds for their accommodation must perforce be constructed. The line, as it now exists, built up to what we may call this minimum standard, is probably capable of carrying over its whole length not less than fifty fully loaded trains per diem. As a matter of fact it carries more like six or eight very lightly loaded trains. And the company who built the line can hardly have expected any greatly different result. For the district cannot provide the traffic necessary to fill the line to its full capacity. In other words, a railway must in the nature of things allow for the fact that its capital will very often not be fully utilized.

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[1] The railways of the world (total capital this figure, not mere road) represent something like seven times this sum. See *Archiv für Eisenbahnwesen*, May, 1903.

Take another recent instance of a very similar kind. The Great Central Company have opened another line about 100 miles in length, their extension to London. Per mile they have probably spent ten to twelve times what the West Highland line cost. Again, the expenditure was necessary, if the line was to be made at all. Road, stations, and everything had to be made up to the standard of the old-established companies, or traffic could never have been obtained in competition with them. And if an adequate and accessible London terminus could only be obtained at the cost of buying up and pulling down acres of houses, even so the expenditure had to be faced. To face the expenditure was to run a serious risk; to refuse to face it was to doom the enterprise at the outset to permanent failure. And now the money has been spent and the line is there, ready equipped to deal with an immense volume of traffic of every kind. Naturally the traffic grows but slowly, and it is safe to say that, if the traffic over the London extension were quadrupled or quintupled, the company would need to deal with it only an expenditure on the road of new capital relatively trifling.

Once again. Imagine that the traffic of the London extension increased to the point when the present two lines needed to be increased to four; imagine a development of the Highlands that compelled the West Highland to double its existing single line. Again, though a double line costs nothing like twice what a single line costs, there would be a great expenditure of new capital. But there would be no corresponding jump in the traffic. The old capital would become at once less remunerative as the net receipts would be spread over the old and the new capital alike.

From this an important corollary follows. Capital, as we have seen, may remain stationary, though the traffic and the receipts therefrom increase many fold. We may turn this another way, and say that the greater the traffic on a railway the less heavily the charge for capital falls on the traffic over it. Say that a railway costs £10 000 per mile and earns £1000 per mile per annum[1]. Assume that the working expenses amount to 60 per cent. of the gross receipts. We have then left £400 to pay interest on the capital at the rate of 4 per cent. Now suppose the traffic to double. Even assuming the working expenses still to absorb 60 per cent. of the receipts—and as we shall presently see the tendency is, other things being equal, for the percentage of expenses to fall as traffic increases—we shall have £800 per mile available as net income. Of course the whole of this may be absorbed as increased remuneration of capital. But in practice what is likely to occur is this: Half the capital is borrowed money, or preference shares bearing a fixed rate of interest. So, if the traffic of the railway is mainly non-competitive, the £800 will be divided, £200 for the £5000 of debentures and preferences at the old rate; say £300 for dividends on the ordinary stock at the rate of 6 per cent.; while of the remaining £300 half will be put into improvements of the line which strictly might be charged against capital, and the other half will be given away to the public in the shape of reductions of rates and fares. If, on the other hand, the railway is either exposed to keen competition from existing lines which might take away the traffic, or liable to have new lines built to tap its territory, the probability is that the dividend will not be increased. The new free revenue will either be given away at once in reduced rates or invested in improvements; so not only making the shareholders' dividends more certain in the present, but also giving the public, if not the hope of reduction, at least a guarantee against increase in charges in the future.

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[1] This relation between capital and income represents average English conditions. An English railway is probably the only profitable industrial undertaking in the world which takes ten years to turn over its capital.

We may even push the point further and say, quite contrary to the common opinion, that the cheaper the line —speaking of normal practical fact and not of what is theoretically to be expected—the heavier will be the charge on traffic for the use of the capital employed in its construction. For instance, the Waterford and Tramore Railway has cost £10 000 a mile. The North London has cost £330 000. The former line devotes £52 out of every £100 of its gross receipts to the remuneration of capital, and yet only pays 5 per cent. of ordinary dividend. The latter company only devotes to this purpose £42 out of every £100 it receives, and yet pays interest at the rate of 6¾ per cent. on a capital which, per mile, is thirty-three times as large.

The moral is obvious. We often hear it said that light railways ought to be constructed in poor agricultural districts, because, being cheaply built, and so having a small capital per mile on which to earn interest, they would be able to afford to carry traffic at rates below those charged by the ordinary railways. The truth is: the fact that it is necessary to give artificial encouragement to the construction of such lines implies that there is little prospect of their carrying anything but a light traffic; that therefore the capital charge, though absolutely light, will be relatively heavy, for it will need to be borne by only a few contributories. A great English line, costing £40 000 per mile, but having 1 000 000 tons per annum to carry over each mile, may, if worked at 50 per cent. of its gross receipts, earn a 6 or 7 per cent. dividend, though each ton contributes to capital no more than a halfpenny per mile; a great American line, costing £10 000 a mile, but with the same volume of traffic worked at the same rate, needs only a profit of half a farthing per ton-mile to do the same; but a light railway, costing only £4000 per mile, but with only 40 000 tons per mile, even if it also could keep down working expenses to 50 per cent. of the gross receipts, which is hardly probable, would be obliged to charge very nearly twopence a mile in order to pay interest on its modest capital at the rate of 4 per cent[1].

Not much need be said about the £150 000 000 invested in rolling stock. We may note, however, that, while the railway line must be practically complete before it begins to carry traffic and earn revenue, this is much less the case with engines and vehicles. A considerable stock, more indeed than is likely to be required, must be provided at the outset, but additions can be made afterwards with no difficulty or extra expense; whereas to widen a line or enlarge a station after the railway is open means not only enhanced expense but also to a considerable extent the sacrifice of capital already invested. Another distinction is that, whereas the line is built for the use of the traffic as a whole, the cost of rolling stock can, to a considerable extent, be allocated to separate classes of traffic. Rolling stock, moreover, not only needs much larger relative expenditure on maintenance, but also needs entire replacement within comparatively few years. The maintenance and renewal of the rolling stock in this country cost in 1902 about £11 500 000, or 7·66 per cent. of what we have estimated to be its capital cost.

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[1] Two practical conclusions from the above may be noted here. If it is necessary for a light railway to be built independently, it ought to be permitted to charge rates and fares very much in excess of those which would be reasonable on main lines. Secondly, the proper people to build light lines are the main-line companies with which the light lines connect, for they obtain from the construction of a new branch an accession of new traffic which, while contributing to the remuneration of the old main-line capital, does not as a rule imply any expenditure on that line of new capital for its accommodation.

It will be noted that all these calculations proceed, for simplicity's sake, on the assumption that the railway either carries no passenger traffic or carries it at a price exactly equal to the cost of carrying it. Neither assumption is likely to be true in actual practice.

We may notice, however, that rolling stock must be provided to meet maximum current requirements. If those maximum requirements only exist for, say, one month out of the twelve, evidently the vehicle must earn in that single month, amongst other things, the full charge for capital and maintenance for the entire year. In other words, the charge for capital for rolling stock in that month will be exceedingly high. Hence, while it may pay a railway company to carry excursionists at a farthing a mile for nine months of the year, when they make use of rolling stock that would otherwise be idle, the same company will naturally not encourage excursion traffic at such rates in August, when it would mean building extra vehicles for their accommodation.

Of capital expenditure on docks, steamboats, hotels, canals, and other undertakings outside the railway undertaking proper, nothing need be said in a book whose object is to consider the special characteristics of railways.

CHAPTER III

RAILWAY EXPENDITURE

In ordinary domestic economy, the earning or at least obtaining an income naturally comes before the spending of it; but with a railway this is not so. Just as an hotel from the day it opens its doors must light and warm its rooms and retain a staff of servants whether guests come or not; just as an ocean liner costs per voyage almost the same whether a hundred or a thousand passengers are on board; so with a railway. And indeed more so. For an hotel can be partly closed, a steamship company can run smaller and cheaper boats in the off-season; the great bulk of the expenditure of a railway company has to go on whether the traffic to pay for it comes or not. Short of closing a line altogether, which of course means abandoning all hope of ever securing any return on the capital invested in the line, there is no way of securing that expenditure shall not exceed income[1].

An examination of the expenditure of English railways will show clearly the extent to which expenditure is independent of income. The companies of the United Kingdom are reported to have spent in 1902 on working their railways in round figures £64 500 000[1]. This sum in the statutory accounts of the several companies, and in the official returns founded on them and published by the Board of Trade, is divided among the following heads:

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[1] The statement in the text only partially applies to old-established railway companies with a developed and fairly constant business. And even where their newly-opened branches are spending more than they earn, the accounts do not show it. But it has been officially stated that, for instance, the West Highland Railway, now practically absorbed in the North British, is worked at a loss for some nine months in the year. The Eastern and Midlands Railway, now taken over by the Great Northern and Midland Companies jointly, used for years to show a loss

	£
Maintenance of way and works	10 200 000
Locomotive power	18 700 000
Repairs and renewals of carriages and wagons	5 500 000
Traffic expenses	20 200 000
General charges	2 500 000
Rates and taxes	4 200 000
Government duty	350 000
Compensation:	
To employees	140 000
Personal injury to passengers	140 000
Damage to or loss of goods	480 000
Legal and Parliamentary expenses	300 000
Miscellaneous	1 800 000
Expenditure not allocated	60 000
Total	£64 570 000

The above classification of expenses, which rests on

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on working in its accounts for the June half-year. The Golden Valley Railway was worked for some years by an independent company. Though maintenance expenditure was cut down till the line was hardly safe, the outgoings always exceeded the receipts, and in the last year before the enterprise was abandoned, the ratio of expenditure to earnings was 146 per cent. It may be added—as illustrating the point in the last chapter, that a railway useless as a railway is valueless for any other purpose—that, after lying derelict for some years, the Golden Valley Line was sold to the Great Western for £10 000, a sum which can hardly have equalled the cost of the land on which it was laid.

[1] They spent another £3 000 000 on docks, canals, and steamboats, with which we have no concern here.

the authority of an Act of Parliament passed nearly forty years ago, follows no logical order, and is based on no logical system. We shall understand the accounts better if we re-classify them. 'Rates and taxes' and 'Government duty' we may best strike out altogether. They represent not so much an actual expenditure as a deduction from income. 'Compensation' ought to come in where it belongs. Compensation to an injured plate-layer is properly part of the 'Maintenance of way' expenditure; to an engine-driver is part of the 'Locomotive power'; and so on. 'Parliamentary expenditure,' if incurred in the promotion of a new line, is properly part of the capital cost of that line; if incurred in opposing a scheme believed to be contrary to the company's interest, is a general charge; in other words, is included in expenditure incurred not in any special department of work, but for the benefit of the undertaking as a whole. Similarly, legal expenses should go where they belong. Fighting a claim for compensation for damage to goods is a necessary part of the cost of carrying goods; prosecuting for trespass on the line belongs to the expense of 'Maintenance of way'; as would also litigation with, or drawing a contract with, a builder for station repairs, and so forth. 'Miscellaneous' and 'not allocated' we evidently cannot deal with, beyond saying that, so far as these items represent expenditure incurred for the benefit of the undertaking as a whole, they ought to come under 'General charges'; if they represent expenditure incurred by or on behalf of a particular department, they ought to appear under the heading of that department.

There remain, then, to be dealt with the first five heads of the Board of Trade list. And here one further correction must be made. 'Locomotive power' is not a logical division. It includes two quite different things, 'Repairs and renewals of engines,' an item absolutely on all fours with 'Repairs and renewals of carriages and wagons'; and secondly, the cost, both in wages and in fuel and other supplies, of working the engines along the railway. This latter is evidently a part of 'Traffic expenses.' The driver's wages are just as much a part of the cost of working a train as those of the guard; coal for the engine belongs to exactly the same class of expense as grease for the wagon wheels. Let us then divide up the £18 000 000 odd of 'Locomotive power' under the two heads, which the Board of Trade returns enable us to do with quite sufficient accuracy for present purposes, and we shall find that 'Repairs and renewals of engines' cost about £5 750 000, while 'Working of engines' costs £13 000 000.

We are now in a position to reconstruct our table. Omitting altogether the £4 550 000 of rates and taxes and Government duty, and allocating the other small items as well as we can where they really belong, our table will be as follows[1]. The reason for the new order in which the items appear shall be given directly.

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[1] It should be stated that the re-arrangement of our English figures made in the text is no personal suggestion of an individual writer; it would practically bring England into line with the remainder of the non-English railway world. The subject is dealt with in more detail in a paper on 'English Railway Accounts and Statistics,' read by me before the Royal Statistical Society, and published in the Society's Journal for December, 1902.

		£
A. General charges		3 000 000
B. Maintenance of way and works		10 500 000
C. Maintenance of rolling stock:		
Carriages and wagons	£5 500 000	
Locomotives	5 750 000	11 250 000
D. Traffic expenses		35 000 000
	Total, say	£59 750 000

CHAPTER IV

RAILWAY EXPENDITURE (contd.)

GENERAL EXPENDITURE AND MAINTENANCE OF WAY

In the last chapter we reduced all railway expenditure to four main heads—general, maintaining the fixed plant, maintaining the movable plant, doing the work. A good deal might indeed be said for putting the second and third heads together and grouping expenditure into

(1) Maintaining the organization;
(2) Maintaining the plant;
(3) Doing the work.

But the quadruple division is not only commonly accepted, but also corresponds to the practical administrative organization of railway undertakings in all countries, so it had better be adopted here. Whether we group the expenditure under three heads or four, the order as given above seems logical, as it represents the natural progression from the general to the particular; first, the organization of an enterprise; secondly, the maintenance of the machinery required; and lastly, the carrying into effect of the objects of the enterprise.

We begin then with the 'general charges,' which in the last chapter were defined as meaning 'expenditure incurred, not in any special department of work, but for the benefit of the undertaking as a whole.' The amount is £3 000 000 out of £60 000 000; 5 per cent., that is, of the total. The expenditure includes the fees and expenses of the directors; the salaries and expenses of the secretary, general manager, and other officers belonging to what may be called the head-quarters' staff, with their subordinates; the cost of auditing and accounting, law charges, management of property, insurance, so far as any of these things are not special to particular departments; the conduct of correspondence with the shareholders and outside authorities, and the like[1].

It will be noticed that this class of expense has but slight and indirect connexion with the amount of business done and money earned by the railway, and will hardly decrease if business falls away and profits disappear entirely. The traffic of the North-Western might increase 20 per cent. without adding one penny either to the directors' fees or the general manager's salary. On the other hand, if shareholders increased in number and took to demanding more detailed information; if Parliament compelled the publication of statistics such as are compiled in all other countries;

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[1] As a matter of fact, in English accounts 'general charges' are made to include many things which ought not properly to be so included, and do not come under the definition of the text at all; e.g. 'Clearing-house expenses,' obviously a traffic charge; 'Fire insurance,' the bulk of which belongs to whatever department is responsible for the insured property. 'General charges' proper account for much less than 5 per cent. of the total expenditure.

though traffic receipts and capital both remained stationary, the general charges would go up, though of course the increased expenditure would relatively to the whole working expenses be exceedingly trifling. We may notice another thing—the bigger the undertaking, the less relatively the burden of 'general charges.' Taking, for instance, two companies coming next to one another in the Board of Trade returns, we find the Lancashire and Yorkshire, with a total expenditure of nearly £3 500 000, spending under this head less than £90 000, or roughly 4 per cent., while the Lancashire and Derbyshire spends £6500 out of £70 000, nearly 9 per cent. The Lancashire and Derbyshire cannot cut down this expenditure, though its ordinary shareholders have never yet seen one penny of return on their capital. The Lancashire and Yorkshire has no need to increase it, though the company pays a steady 4 to 5 per cent. dividend.

To turn to expenditure of more serious moment. 'Maintenance of way and works' costs £10 500 000 per annum, or in round figures £500 per mile of open line. The average of £500 is made up of widely discrepant figures. The Lancashire and Yorkshire, with (according to the Board of Trade statistics) 559 miles, spends £523 000, or £930 per mile. The Midland Great-Western of Ireland, with 538 miles, spends £78 000, or £145 per mile, say 15 per cent. of the former sum. If we take small homogeneous railways, instead of large companies maintaining many different lines of widely varying character, we shall find much more startling discrepancies. At one end of the scale we have the North London, spending close on £3000 per annum on each of its twelve miles; at the other the Waterford and Tramore, which maintains its entire seven miles for no more than £596, or say £85 per mile.

It is perhaps as well, before going further, to notice that 'a mile of line' is a most deceptive figure. The £523 000 spent by the Lancashire and Yorkshire really maintains not 559 but 2049 miles of track—to use the convenient and self-explanatory American term which has no English equivalent; viz. running line, 25 miles single, 455½ double, 78½ quadruple, or 1250 miles in all, and 799 miles of sidings. On the other hand, the nominal 538 miles of the Midland Great-Western correspond to an actual mileage of 799 miles, made up of running line 377 miles single and 161 double, and 80 miles of sidings[1]. In other words, per mile of track the Lancashire and Yorkshire spends not £930 but £260; the Midland Great-Western not £145 but £100. The ratio of the one to the other, instead of being as 15 to 100, is therefore about 36 to 100. Even excluding siding mileage, the change in the figures as published by the use of 'running track' instead of 'open line' mileage is sufficiently noticeable. The North London twelve miles become thirty-four miles; the seven of the Waterford and Tramore still remain seven. While the expenditure per mile of the latter company remains at £85 per mile, that of the former comes down to £1037.

The comparison between the North London, a Metropolitan railway crowded not only with passengers but with goods, and the Waterford and Tramore, built for the pleasure traffic between a third-class provincial town and an adjacent sea-side village, is hardly likely to yield results of much practical value, and need not be pushed further. But the Lancashire and Yorkshire and the Midland Great-Western may fairly be taken as typical, the one of railways in busy and thickly populated districts, the other of a purely agricultural line. So let us compare their expenditure on maintenance in somewhat more detail. Probably the fairest basis of comparison is something between the two methods that have been adopted above. Actual length of track to be maintained must be taken notice of. On the other hand, sidings do not cost as much as running line. Perhaps, though the cost of maintenance of different classes of sidings must vary greatly, we should not go very far wrong if we regarded three miles of siding as equal to one mile of running line. On this basis the Lancashire and Yorkshire maintains $1250+\frac{799}{3}=1516$ miles; the Midland Great-Western maintains $699\times\frac{80}{3}=$ 726 miles. Let us call these assumed miles for convenience hereafter 'unit miles.' Per unit mile, then, the Lancashire and Yorkshire spends each year on maintenance £345; the Midland Great-Western £108. In round figures, that is, a line with very heavy traffic where labour is dear costs a little more than three times as much per mile to maintain as a line with light traffic in a district where labour is exceedingly cheap.

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[1] From information privately supplied. No English railway publishes figures of siding mileage. [Since this was written, the Board of Trade Returns for 1903 have for the first time given the figures of siding mileage.]

But when we come to take into account the traffic carried over the line, the comparison is changed entirely. Reckoning by mere numbers of passengers and tons of goods carried, we find that the Lancashire and Yorkshire carried forty times as many passengers, 200 times as many tons of coal, and fourteen times as many tons of general merchandise as the Midland Great-Western. But we cannot compare on this basis, for in Ireland the traffic was certainly carried on the average longer distances (required, that is, the maintenance of more miles of line) than in Lancashire. But what the ratio between the average distance in the two countries is we have no means of knowing; so we must compare on another, though less satisfactory basis. Each unit mile of the Lancashire and Yorkshire earned in the year £3640; of the Midland Great-Western £810. The rich company, that is, spent three times as much per mile, but earned four and a half times as much. Of course earnings, which represent the product of traffic carried multiplied by rates charged, are not the same thing as work done. But in this case we can confidently guess—and it is not often that, with English railway statistics as they are, one even gets as far as confident guesses—that, if a unit mile of the Lancashire and Yorkshire earned four and a half times as much as a unit mile of the Midland Great-Western, it carried at the very least four and a half times as much traffic. For we know that the English line ran seven times as many train miles (18 100 000 against 2 600 000), and we can hardly think that a train is often less heavily loaded in Lancashire than in Connemara. We can feel reasonably certain, moreover, that average fares and rates were lower in England, with its immense coal traffic and its highly developed system of cheap passenger fares (workmen's tickets, season tickets, excursion tickets, &c.), than in Ireland, where the bulk of the traffic is at normal fares. On the whole we shall probably not err in saying that the traffic density in the former case is six times that in the latter. In other words, cost of maintenance on the heavy line is three times as great, but traffic density is six times as great, therefore cost of maintenance per unit of traffic is only one-half[1].

Fortunately we can confirm our English conjectures by the precise figures published by the railways of the United States. The Pennsylvania Railroad Division, the nucleus of the great Pennsylvania Railroad Company's system, with probably the heaviest traffic in the world, cost in 1900 £800 per mile of open line to maintain. The traffic density was 5 250 000 traffic miles per mile of line. That is, cost of maintenance per mile chargeable against each traffic unit passing over that mile was ·038*d.* The Southern Pacific, with only two first-class towns (San Francisco and New Orleans) on all its 7500 miles of line, spent no more than £218 per mile, little more than one-fourth; but the traffic density was no more than 750 000, or one-seventh.

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[1] The unit of traffic is one ton of goods, or one passenger carried one mile; or, shortly, the ton mile and the passenger mile. For many purposes, at least under English conditions, one may treat ton miles and passenger miles as equivalent and add them together to produce traffic miles. Traffic density is the number of traffic miles over each mile of line per annum. The figure is the quotient of the total traffic miles run on the railway, divided by the length in miles of the railway. These figures, practically universal in other countries, are never published and only exceptionally calculated out in England.

Consequently, the cost of maintenance chargeable against each traffic unit was ·075*d.*—practically double the Pennsylvania cost[1].

So we come to the conclusion that the same thing is true with reference to cost of maintenance which we have already seen to be true in regard to charge for the remuneration of capital; cost increases absolutely as traffic increases, but increases at a much slower ratio. In other words, the charge per unit of traffic decreases. Once more, so far as maintenance expenditure is concerned, it is the lines which spend most which can afford to carry traffic cheapest.

Now let us turn to another point. What is the cause of the expenditure? How is the increase of expenditure, which we have seen is incurred as traffic increases, due to increased wear and tear, and how far is it merely the result of exposing a larger and more costly plant to wind and weather? The English accounts hardly give sufficient detail to enable us to answer this question. Here is a specimen taken from

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[1] The American figures in the text are given per mile of open line, not per unit mile. Per unit mile they would be roughly as follows :—

	Pennsylvania Railroad Division.	Southern Pacific.
Unit mileage . .	3264	8100
Cost of maintenance .	$6 834 000	$8 261 000
Cost of maintenance per unit mile . .	£420	£204
Traffic density per unit mile . . .	2 500 000	600 000
Cost of maintenance per traffic unit . .	·04*d.*	·08*d.*

the Midland Railway accounts—half-yearly, be it noted, not annual:—

MAINTENANCE OF WAY, WORKS, ETC.

	£	s.	d.	£	s.	d.
Salaries, office expenses, and general superintendence				22834	9	8
Maintenance and renewal of permanent way:—						
Wages	159927	0	0			
Materials	92692	9	3			
Engine power	10507	2	5			
				263126	11	8
Repairs of roads, bridges, signals and works				96637	14	5
Repairs of stations and buildings				100645	10	5
				483244	6	2
Maintenance of canals				1364	8	6
				£484608	14	8

Miles maintained:—

	M.	Ch.
Six lines	7	38
Five lines	14	73
Four lines	186	00
Three lines	13	56
Double line	900	5
Single line	391	63
Total	1513	75

Of the three main heads of expenditure we may safely say that repair of buildings is mainly due to wind and weather; that repair of bridges[1], culverts, viaducts, tunnels, and the like—except so far as heavier traffic may necessitate the replacement of light girders by stronger ones—is also mainly due to the same cause[1]. 'Maintenance and renewal of permanent way,' more than half the whole expenditure, is more difficult to apportion. Rails undoubtedly wear out rather than rust out; sleepers rot rather than wear. The constant jar of passing trains is responsible for the tightening up of joints, and the repacking of ballast, which forms a large portion of the platelayer's daily task. On the other hand, the ballast itself is washed away or rendered unfit for its purpose by weather. The maintenance of fences, the cleaning of ditches and the like, have nothing to do with the amount of traffic over the line.

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[1] Roads in the above list mean ordinary carriage roads, either public roads where they cross the railway on bridges, which the company is required by law to maintain, or private roads in station yards. The item cannot be of much importance.

If we turn to the figures for the Pennsylvania Railroad Division referred to above, we find our 'Maintenance and renewal of permanent way' split into nine items. The repair of the roadway is distinguished from repair of the track; the cost of new rails, sleepers, ballast, &c., is given separately.

Broadly, it appears that out of an expenditure of $4 700 000 one-third is attributable to weather, two-thirds to wear. If we applied this proportion to the Midland figures we should then have under 'Maintenance and renewal of permanent way' about £180 000 attributable to wear, £80 000 attributable to weather. Adding in then the expenditure under the other two heads, we should have £280 000 for weather as against only £180 000 for wear. That is, about three-fifths of the maintenance-of-way expenditure is independent of the traffic passing over the line; in other words, is only indirectly and remotely affected by an increase of traffic.

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[1] 'Repairs,' of course, include replacement of obsolete buildings and works. They also include additions not charged to capital, a percentage of the whole that must vary very widely on different lines. But in any case it is clear that betterments are even less due to wear and tear than are repairs proper.

We shall recur to this point more at length hereafter. Meanwhile we may notice this, that a railway manager, calculating whether additional traffic—offered to him presumably at an unusually low rate—will pay him or not, is entitled, in estimating the probable extra expense which the additional traffic will cause, to leave out of account more than half of his permanent-way expenditure as being unaffected by the volume of traffic.

One other point we may notice in conclusion. With the exception that a portion of the expenditure on stations and buildings can be allocated to passengers and goods respectively, the whole of this expenditure is incurred not for any separate class of traffic, still less for any of the separate components of that class, but for the traffic of the line as a whole. If passengers ceased entirely to travel for a twelvemonth, the expenditure could not be greatly reduced, though of course it might be postponed to a more convenient season. If the goods ceased entirely, and the passengers were left in sole possession of the line, the possible reduction in expenditure would be even smaller. Evidently, in the cases supposed, the goods rates or the passenger fares, as the case might be, would have to find the whole of the money to maintain the line. Otherwise it would be closed.

In practical fact, of course, both classes of traffic go on alongside. But it may well be that in certain countries, or at least on certain railways, the whole maintenance expense is charged upon one class of traffic only. In a poor country of great distances like Russia fares must be very low, or very few passengers could afford to travel at all. In a small rich country like Holland, passengers can and will pay relatively high rates per mile; while, in competition with the canals which seam the country in every direction, goods traffic in any volume can only be attracted by very low rates. And to the railway manager, provided his road is maintained somehow, it matters not whether it be at the expense of passengers or goods.

CHAPTER V

RAILWAY EXPENDITURE (contd.)

ROLLING STOCK AND TRAFFIC

NOT much need be said as to the expenditure on maintenance and repair of rolling stock. We saw above[1] that the total value of all the rolling stock in the country—engines, carriages and wagons—was probably something like £150 000 000; in other words, it represented about 15 per cent. of the total capital. We saw also[2] that the cost of repairs and renewals was nearly £11 500 000 per annum; or 7·66 per cent. of its value, 19 per cent. of the total expenditure, and 11½ per cent. of the total traffic receipts of the railways. It will be useful both to check and to amplify this rough estimate by using the somewhat more detailed figures of one particular company. The Midland Railway accounts for the year ending June, 1903, show as follows: total capital (excluding nominal additions), £107 000 000, out of which rolling stock is set down for £17 000 000, nearly 16 per cent. On maintenance and renewals of rolling stock there was spent in the year £1 264 000; that is, over 7 per cent. of the capital value. This expenditure equalled over 10 per cent. of the gross receipts, over 17 per cent. of the total expenditure. Dividing the £1 264 000 spent under the three main heads, we find that repairs and renewals of engines cost £720 000, say 57 per cent. of the total spent on rolling stock; those of carriages, £210 000, or 17 per cent.; wagons, £534 000, or 26 per cent.

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[1] See p. 11.

[2] See p. 19.

The fact that the Midland spends each half year some 25 per cent. more in maintaining rolling stock worth only £17 000 000 than it does on maintaining lines and works that have cost £80 000 000 strikes us at the outset. The difference in rate clearly implies more than a difference in the character of the property maintained. No doubt vehicles wear out faster than banks or bridges, or even stations, but scarcely seven times as fast. Clearly much of the expenditure on rolling stock is caused not by patching up old engines and carriages, but by replacing them by new ones. And this replacement is necessary because the stock, though perfectly sound and roadworthy, is out of date and no longer adapted to modern requirements.

The distinction is of some importance, for this reason. So far as the expenditure on rolling stock is caused by wear and tear, evidently it will increase with each additional mile the stock travels. But an engine or carriage will grow antiquated just as soon if it remains in a shed as if it is constantly on the line. The moral, of course, for the practical railway manager is to get all the mileage he can out of his rolling stock, so that the time when it is worn out may arrive at least as soon as the time when it is out of date. For the student the moral is, that so far as rolling-stock expenditure represents replacement of material, obsolete though not worn out, so far it is independent of work done. In other words, rolling stock which would otherwise be unemployed can be profitably employed in carrying traffic if—other things being provided for—the receipts cover the expenditure for maintenance proper though not for replacement.

There is another point. Wear and tear is the result of movement. An engine, a carriage, or a wagon deteriorates practically equally as fast whether it runs light or fully loaded. Therefore, if the stock has to run at all, it makes no difference how lightly it is loaded. Evidently under this head lines with heavy traffic have once more an advantage over lines in poor districts. Evidently also, in calculating how low he can afford to reduce his rates in order to attract traffic that otherwise would not come at all, the practical railway manager can afford to leave altogether out of account the cost of rolling-stock repairs, so far at least as stock actually used on existing trains is concerned.

Of the total sum spent a good deal more than half is spent on the engines. Now engines are nominally divided into goods and passenger classes, but they are in practice very largely interchangeable. Coal engines may not haul fast expresses, nor express passenger engines coal trains; but each of them will eke out their own proper work with the haulage of the large intermediate class of fast goods and slow passenger trains. Further, a large part of the expense of the repair shops, the machinery and standing charges, is incurred for all classes of engines alike. So, taking engine repairs in the lump, we may say that a considerable portion of them is incurred on behalf of the traffic as a whole, and cannot be separately allocated to goods and passengers.

With carriage repairs and renewals 2·89 per cent. of the total working expenses, and wagon repairs and renewals 4·42 per cent., we at length and for the first time reach a heading of expenditure, absolutely though not relatively considerable, which we can allocate to one portion of the traffic only. But even here we cannot go beyond the broad division into passengers and goods[1]. A first-class vehicle carries traffic of very different kind when in the morning it conveys a season-ticket holder paying at the rate of perhaps ½*d.*, and in the afternoon the season-ticket holder's wife at the ordinary fare of 1½*d.* to 2*d.* per mile. So, too, a goods truck may carry one day shipping traffic at a minimum rate, and the next miscellaneous 'smalls' at a rate per ton many times as high.

So far, then, we have analysed an expenditure of £25 000 000 (3 + 10½ + 11½), and found that roughly three-quarters of it is incurred on behalf of the traffic as a whole, and only one-fourth can be allocated even to the extent of dividing passengers from goods, and that this quarter itself is not practically susceptible of any further or more detailed allocation.

There remains to be dealt with the expenditure of £35 000 000, 58 per cent of the total. This is the sum actually spent in doing the work, for which all the expenditure hitherto dealt with has been only a necessary preliminary. The sum is made up, as explained earlier[2], of what are called in England 'traffic expenses,' £22 000 000, and 'locomotive running expenses,' £13 000 000. Clearly, we must combine them if we wish to arrive at the real cost of what the Americans conveniently call 'conducting transportation.'

Let us first check our general figure by instances of particular companies. Taking two of different types, as the one is mainly a goods, the other mainly a passenger railway, we find that the Midland spent, out of a gross outlay of £7 109 000—on 'traffic expenses,' £2 614 000; on 'locomotive running,' £1 610 000; together, £4 224 000, or 59 per cent. The London and South-Western, out of a gross 'railway' outlay of £2 809 000, spent £828 000 and £621 000 respectively; together, £1 449 000, or 52 per cent.[1].

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[1] Fish trucks, carriage trucks, milk vans and the like, are as a matter of actual practice included not under wagon but under carriage repairs, because though they do not carry passengers they run on passenger trains, and their earnings are included in passenger receipts.

[2] See p. 24.

English accounts are unfortunately useless for the purpose of showing how this money really goes. Practically we only get three heads of importance—locomotive wages, locomotive coal, wages of the traffic staff in one block—and then half a dozen petty items of no importance either for their amount or their composition. Here is the portion of the last South-Western account bearing upon the question:—

ABSTRACT B. Locomotive Power.

	£	s.	d.	£	s.	d.
Salaries, office expenses, and general superintendence .	.		.	4658	10	8
Running Expenses—						
Wages connected with the working of locomotive engines	125861	17	0			
Coal and coke . . .	152421	14	8			
Water	8898	1	11			
Oil, tallow, and other stores	11198	17	5	298380	11	0
Repairs and Renewals—						
Wages	*48068*	*7*	*1*			
Materials . . .	*38079*	*9*	*11*	*86147*	*17*	*0*
				£389186	*18*	*8*

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[1] Traffic expenses are naturally low on a passenger line, for passengers load and unload themselves. Moreover, the South-Western goods traffic is largely through Southampton, and the expense of dealing with it there is included in the separate dock accounts.

ABSTRACT D. TRAFFIC EXPENSES.

	£	s.	d.
Salaries and wages, &c.	317540	8	11
Fuel, lighting, water, and general stores .	50750	15	0
Clothing	10166	16	5
Printing, advertising, stationery, postage and tickets	20844	12	9
Horses, harness, provender, &c., for shunting	2347	15	10
Wagon covers, ropes, &c. . . .	4717	12	4
Miscellaneous expenses . . .	4778	16	7
	£411146	17	10

Outside the British Isles, and free from the fetters of a statutory form of accounts, fixed forty years ago and practically unchanged since, English railway-men have expanded and improved the rudimentary forms to which they were accustomed at home, till it has really become possible to extract information from them. Here is what our English Abstracts B. and D. have grown to in Argentina, as shown by the report for the year ending June, 1903, of the Buenos Ayres Western Railway Company, Limited :—

ABSTRACT E.

LOCOMOTIVES :—RUNNING EXPENSES.

	£	s.	d.	£	s.	d.
Superintendence—						
Salaries . . .	2254	0	5			
Materials . . .	635	5	3			
				2889	5	8
Drivers and firemen—						
Salaries and wages . .	28743	6	5			
Premiums . . .	742	10	2			
				29485	16	7
Carried forward . . .				£32375	2	3

	£	s.	d.	£	s.	d.
Brought forward				32 375	2	3
Locomotive deposit—						
Salaries and wages	6 520	12	3			
				6 520	12	3
Fuel—						
Coal	71 360	4	4			
Petroleum	136	5	5			
Firewood	315	2	11			
Salaries and wages—inspectors and coalers	2 578	9	9			
Implements and equipments maintenance	172	2	6			
				74 562	4	11
Water—						
Pumping—						
Salaries and wages	1 428	7	4			
Water rates	100	7	11			
Materials and horse-keep	1 115	11	9			
Pumps, windmills and accessories—Maintenance—						
Salaries and wages	323	5	5			
Materials	388	14	0			
				3 356	6	5
Oil for lubrication				1 613	9	5
Grease for lubrication				497	12	3
Waste				791	8	5
Anti-incrustante powder				1 045	7	11
Materials of general consumption				970	3	0
Tools and equipment—maintenance				1 037	12	2
Uniforms				431	8	9
Expenses and allowances to drivers and firemen				4 073	2	8
Equal to 10·78 per cent.				£127 274	10	5

ABSTRACT F.

Vehicles :—Running Expenses.

	£	s.	d.	£	s.	d.
Superintendence—						
Salaries	116	17	4			
Materials	29	5	4	146	2	8
Wages of revisers and greasers				2 338	5	7
Oil for lubrication				527	2	1
Grease for lubrication				962	15	2
Material of general consumption				258	9	11
Implements and equipment maintenance				75	17	2
General expenses				1	9	8
Equal to 0·37 per cent.				£4 310	2	3

ABSTRACT G. Traffic Expenses.

	£	s.	d.	£	s.	d.
Superintendence—						
Salaries	8 510	16	4			
Materials, cleaning and lighting	22	0	11			
Time tables and advertising	1 537	7	4			
General expenses	1 415	12	6	11 485	17	1
Stations—						
Salaries and wages—						
Station masters and clerks	32 942	3	7			
Telegraph operators and messengers	8 260	11	8			
Signalmen and pointsmen	2 386	15	0			
Shunters and couplers	5 813	3	9			
Capataces and Peons	35 663	5	8			
Materials—						
Books, forms and stationery	4 629	15	11			
Lighting stations and signals	1 778	4	10			
Furniture and general equipment	1 686	2	8			
Uniforms	603	17	5			
General expenses	2 894	15	5	96 658	15	11
Carried forward				£108 144	13	0

	£	s.	d.	£	s.	d.
Brought forward				108 144	13	0
Electric Light, Once and Caballito—						
Salaries and wages	1 048	9	11			
Materials	1 092	17	0	2 141	6	11
Wagon sheets and chains—						
Maintenance—						
Salaries and wages	349	8	6			
Materials	3 799	7	7	4 148	16	1
Level Crossings—						
Watchmen	4 961	15	1			
Materials, cleaning and lighting	187	19	8	5 149	14	9
Trains—						
Inspectors, guards and brakesmen—						
Salaries and wages.	8 656	12	8			
Uniforms	694	17	2			
General equipment—maintenance	470	19	9			
General expenses and allowances to train staff, &c..	4 020	12	0	13 843	1	7
Gas for lighting coaches—						
Salaries and wages	636	19	6			
Materials	798	6	5	1 435	5	11
Cleaning coaches—						
Sleeping coaches—wages of attendants	427	8	6			
Cleaners' wages	2 168	9	9			
Laundry expenses	216	4	4			
Equipment—maintenance	.	.	.			
Materials and sundries	194	0	5	3 006	3	0
Equal to 11·68 per cent.				£137 869	1	3

Here, though the influence of the traditional English forms has militated against simple and logical arrangement, and though Argentine and English local conditions are widely different, we get some idea of the relative expenditure for different classes of service. Roughly we may group expenditure somewhat as follows :—

Locomotives.

Other train expenses.

Stations and yards.

Watching and signalling on open line.

It will be noticed that in all this detail only three very minor heads, affecting an expenditure of some £9000 or £10 000 out of nearly £270 000, can be said to belong definitely either to passengers or to goods.

More practically convenient is the American grouping. The subjoined statement comes from a railway more nearly comparable with English lines than perhaps any other—the New York, New Haven and Hartford—which serves the oldest and most thickly populated part of the country, and derives half its income from passenger traffic.

CONDUCTING TRANSPORTATION.	$
Superintendence	347 584·74
Engine and roundhouse men	2 403 195·02
Fuel for locomotives	3 564 730·01
Water supply for locomotives	191 517·52
Oil, tallow, and waste for locomotives	107 630·28
Other supplies for locomotives	45 061·51
Train service	2 355 263·88
Carried forwrad	**$9 014 982·96**

	$
Brought forward	9 014 982·96
Train supplies and expenses	542 713·79
Switchmen, flagmen, and watchmen	1 762 225·79
Telegraph and telephone expenses	351 669·18
Station service	4 132 796·90
Station supplies	302 432·32
Car mileage, balance	772 393·26
Loss and damage	122 711·31
Injuries to persons	253 972·74
Clearing wrecks	29 022·26
Operating marine equipment	582 576·13
Advertising	63 425·13
Outside agencies	20 669·15
Rents of tracks, yards, and terminals	365 176·61
Rents of buildings and other property	42 322·76
Stationery and printing	169 842·89
Other expenses, conducting transportation	298 302·29
Total	$18 827 235·47

Out of nearly $19 000 000, we may say that locomotive expenses amounted to $6 300 000; other train expenses to $2 900 000; station and yard expenses to $4 400 000; open line expenses to $2 100 000. Once more it will be noticed that only two items of quite trifling importance, 'loss and damage' and 'injuries to persons,' have any specific reference to passenger or goods traffic respectively. The remaining 98 per cent. of the expenditure appears to be common to both.

The point must not be pushed too far. No doubt a much larger portion of the expenditure could be apportioned. A driver drives either a passenger or a goods train, and his wages might be apportioned accordingly; though if, for instance, he is paid on the basis of a sixty hours' week, out of which he is eighteen hours on passenger work, twenty-five hours on goods work, and the rest of the time idle, the apportionment must be estimate, not fact. The same thing applies to other train staff. Station staff in large stations is assigned exclusively to goods or to passengers, as the case may be. But at country stations a station master or porter spends his employed time partly on goods, partly on passenger work, and during the residue of the time, while he is waiting for work to come, his wages cannot fairly be debited against either department. The expense of signalmen and watchmen evidently belongs to the traffic as a whole. We may take it, then, that of the expenses of conducting transportation a considerable part is non-apportionable; the rest might be apportioned, but in fact is not, even where accounts much more detailed than our English accounts are published.

The fact is surely not without significance. The accounts of the Buenos Ayres Western have been elaborated from the rudimentary English forms with the express object of enabling directors and shareholders at home to exercise some supervision over the spending of their money in Argentina. The form of American accounts is the result of long discussion between trained economists and statisticians representing the Federal Government and a committee of the most expert accountants of the great railway companies. Surely then we are entitled to conclude that if apportionment of expenses had been easy, it would have been made; even if it had been possible, though difficult, it would have been done, had there been any great advantage to be gained by the process.

We have seen why an apportionment is difficult. It would imply an examination and dissection of the time-sheets of every engine and of the bulk of the engine, train, and station staff; the same process would have to be gone through with supplies, and even at the end a large part, both of wages and supplies, would be left over which could only be apportioned on the basis of an arbitrary estimate. And when done, where would be the advantage? Engines and staff have been provided because there was a prospect of their being profitably employed, because a certain minimum of stock and staff was necessary to keep the organization going, ready to deal with traffic as it comes; what matters it if in August the bulk of a porter's time is devoted to handling passengers and their luggage, in November to handling goods?

Once more, the traffic expenses of a full train are little more than those of an empty train; the expenses of a busy station are much less proportionately than those of a small station; the expenses of watching and signalling are practically constant. Once more we see the advantage which the crowded line has over the line with light traffic. Once more we see that the manager can afford, in estimating the minimum rate at which it will pay him to attract new traffic, to leave out of account the bulk of the traffic expenses, as the new traffic will not very greatly increase them.

As the result, then, of our inquiry into railway expenditure the same conclusions seem naturally to emerge as we reached in the case of railway capital.

1. The bulk of the expenditure is incurred on behalf of the traffic as a whole; only a small portion can be even allocated so far as to say that it belongs wholly to passenger or wholly to goods; only the merest fraction

can be assigned to particular groups of passengers or classes of goods; for individual passengers or single consignments of goods practically no expense is incurred at all.

2. Expenses increase as traffic increases, but by no means in direct proportion. Certain expenses—for instance, maintenance of works—hardly increase at all; others—for instance, terminal handling of goods at big stations, where the staff can be normally kept fully employed—increase almost as fast as the traffic; the bulk of the expense is intermediate between these two extremes. On the whole, a common and probably roughly accurate estimate is to say that half the total expense is fixed; half varies with the traffic. That is to say, if it costs x to deal with 1 000 000 units of traffic, 5 000 000 units will cost, not $5x$, but $\frac{1}{2}x + (\frac{1}{2}x + 5) = 3x$. Therefore, the heavier the traffic, the lower (profits remaining equal) need be the rate.

Turning this proposition round, we have a converse proposition, equally true and equally fundamental—the lower the rate the heavier will be the traffic. This leads us naturally to the question which we have next to consider, how a railway earns its income.

CHAPTER VI

RAILWAY INCOME

SOME IMPRACTICABLE METHODS OF CHARGING

THE foregoing chapters have dealt with the nature of railway undertakings from the point of view both of capital and of revenue expenditure. We have seen that the distinguishing features are, *qua* capital, its magnitude and its irrecoverable nature; *qua* both capital and current expenses, the fact that the money is spent for the establishment and maintenance of the undertaking as a whole, and has but slight connexion with special categories and individual items of traffic.

Once we have grasped these fundamental facts, we can promptly get rid of not a few popular fallacies as to the equitable basis of railway rates. Volumes have been written to show that railway rates ought to be based on cost of carriage. For two generations Parliamentary Committees and Royal Commissions have been implored to compel English railways to charge on this basis. Whether it is desirable that railway rates should be so based is a question to which we shall need to recur at a later stage. It is simpler to say at this point that such a basis is impossible, as no one knows, or can know, what the cost of carriage is. To begin with, the phrase itself is ambiguous. Cost of carriage of a particular item may mean the additional cost of carrying that item; this is normally so small as to be negligible. It may mean the additional cost *plus* a fair share of the standing costs of the undertaking. The *plus* figure is nothing more positive than an arbitrarily estimated proportion of a sum that can only be ascertained very roughly, even by a trained railway statistician with access to all the accounts and returns he chooses to call for. Accountants, if required to go into detail, would differ considerably as to what standing costs were affected by a new item of traffic; in other words, to which of the innumerable heads of standing cost the new item ought to be called on to contribute its proportion. Assume it decided that the item in question ought to contribute something to a particular category of costs, what then is its equitable proportion? The question is no longer one for an accountant: it involves social, economical, and political considerations; and each sociologist, economist, and politician would answer it differently. Clearly, there is here to be found no positive objective basis for a system of railway rates. As we shall see presently, all these considerations have to be and are taken into account in fixing railway charges. At this point we are only concerned to note that, the nature of railway business being what it is, rate fixing cannot be an exact science; to claim that rates shall automatically be fixed on the basis of cost of carriage is to claim what is impossible.

A further practical point may also be noticed. Rates must be fixed in advance. It is only afterwards that cost can be even approximately known. Let a rate be fixed at, say, 2*s.* per ton for a certain traffic for a distance of, say, twenty miles, on the assumption that at that rate 1000 tons of traffic will pass. If in fact only 500 tons are sent, the rate will leave—for reasons that were explained in previous chapters—much less profit than was expected. If 5000 tons are sent, the profit will be so much larger that a considerably lower rate would have given more than all the anticipated profit. In other words, assuming the intention to have been to fix an averagely profitable rate, had it been supposed in advance that only 500 tons would go, the rate would have been much higher; had it been supposed that 5000 tons would be sent, the rate would have been very much lower. But a higher rate might have made the traffic even less than 500 tons; a lower rate might have made it even more than 5000. How much less, or how much more, no one can know except by practical experience. It comes, therefore, to this: that, even if it were, which it is not, possible to say what it would cost to carry x units of traffic, no one could so fix a rate as to obtain precisely that cost *plus* a determined percentage of profit, because the percentage of profit varies enormously according as the actual volume of traffic carried recedes on the one side or the other from the assumed volume x.

Another claim often made is for 'equal mileage' rates. Now it needs no argument to show that such rates are the antithesis of 'cost of carriage' rates. For each item of business has a different cost, which is the resultant of all the conditions under which the business is done. We may summarize the conditions under two main heads, physical and commercial. Under the physical conditions take, as an illustration, the one point of gradients. There was till recently a line in Derbyshire—the High Peak Railway—where at one point the load of an engine was limited to a single truck. Down the South Wales valleys an engine can haul to the coast seventy or eighty fully-loaded trucks. Is a ton of coal to pay the same in the two cases? As for commercial conditions, we have seen that main lines can spread their costs over so many units of traffic that the cost per unit is small. On lines with light traffic the cost per unit is necessarily many times larger. Combine the two sets of conditions, as nature usually does combine them, and compare a mountainous pastoral country, such as North Wales, with a flat busy district of dense population, such as South-West Lancashire, and the absurdity of equal mileage rates must surely be obvious[1].

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[1] The French railway companies compile and publish statistics giving, for each section and branch of their system separately, the traffic carried over it, the earnings, expenses, and net profit. Broadly, the result is to show that the main lines with low average rates are splendidly profitable, while the lines with light traffic, spite of higher rates, are in most cases worked at an actual loss. The only attempt with which I am acquainted to give similar information in this country was made by the South-Western Railway before the Court of the Railway and Canal Commission in the Southampton Docks case. In that case, where it was a question of the reasonableness of charging very much higher rates for local and retail traffic than for the wholesale traffic in the same commodities between Southampton and London, figures were produced which were not disputed by the complainants and were apparently accepted by the Court. The effect of them was broadly as follows: a trainload of dock traffic, in bacon, butter, and the like, charged at 6*s.* per ton for seventy-eight miles, earned 12*s.* 6*d.* per train mile, leaving the railway company, after deducting 2*s.* 6*d.* per train mile as cost of working, 10*s.* per train mile net profit. The local traffic came in such small and uncertain quantities that, though the rates charged averaged 15*s.* per ton for an equivalent distance, a train only earned 5*s.* per mile, leaving, after once more deducting 2*s.* 6*d.* per train mile

The theory, unconsciously held perhaps, that equal mileage rates represent substantial justice, not only to the railway company, but also as between competing consignors, is at the bottom of another often-recurring fallacy. The railways connecting the Mersey with London carry south large quantities of American beef at a rate of 25*s.* per ton. On their way to London the trains pass through Cheshire and Staffordshire, and the local rate for meat thence to London is 40*s.* The American traffic is carried, so it has been said repeatedly, 'at the cost of the English farmers[1].' Now, if the figures given above for the relative profitableness of wholesale and retail traffic on the South-Western Railway can be taken as in any way typical, it is evident that a rate of 25*s.* for 190 miles for wholesale traffic will leave a much larger margin of profit, after paying all the expenses that can be debited against that traffic, than a rate of 40*s.* for, say, 150 miles will leave in the case of retail traffic. But let us neglect this. Let us assume that the traffic in the two cases is

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for expenses, a net profit of only 2*s.* 6*d.*, or one-fourth of that in the former case.

The moral seems evident. On 'cost of carriage' principles the difference between the 6*s.* rate and the 15*s.* rate is by no means sufficient. The English producer ought to be charged much more, or else his American competitor should pay much less. It may sound a paradox to the uninitiated, but every practical railway-man knows it to be, broadly speaking, a fact, that, high as the rates for retail traffic are compared to the wholesale rates, they would need to be even higher, were it not that the profitable nature of the wholesale traffic enables the railways to forego almost all—in some cases unquestionably more than all—profit on their retail business.

[1] See, e. g., the evidence of an eminent lawyer and influential Member of Parliament, Dr. Hunter, before the House of Commons' Committee of 1881 on railway rates.

precisely similar and carried at an equal cost. Then, taking the 40*s.* rate as being a normal and averagely profitable rate, we may assume—reckoning working expenses as roughly 60 per cent. of the gross receipts—that, out of the 40*s.*, 24*s.* represent cost and 16*s.* represent profit. If that be so, the 25*s.* rate only leaves a profit of 1*s.* Not much, certainly; but still it is a profit, and there is no trace of loss to be made up at the expense of the local traffic[1].

But this is not really the light in which the matter should be regarded. The railway is there in any case. To Cheshire and Staffordshire it is an absolute necessity. Without it their meat could not get to London at all. Only a very small part of the cost of its maintenance could be saved, if every ton of American meat went by sea direct to London. A liberal estimate of the entire additional cost due to the carriage of a train-load of meat from Birkenhead to London would be £40. Yet 100 tons at 25*s.* would pay £125, and so leave a net profit of £85 to help the inland districts to support the burden of railway maintenance and interest on railway capital, which otherwise they would have to bear unaided[1].

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[1] It is passing strange that, of all the writers and speakers who have accused English railways of carrying foreign at the expense of home produce, no one has ever stopped to ask why this was done. Why should a railway manager, presumably sane, except for mere superfluity of naughtiness, 'charge the people about Wolverhampton in order to make up the loss from Liverpool?' (Evidence of Dr. Hunter, M.P.). Surely if there were a loss, a reasoning being would abandon the Liverpool traffic and keep to himself the undiluted profits of the Wolverhampton business. And the more so because, so far as it is a question of competition between English and American farmers, the whole interest of the English railway is on the side of encouraging the home producer for whom it carries, not merely the dead meat, but also the manure, the feeding stuffs, and all the products of hide, horn, and hoof, to say nothing of all the requirements of the farmer and his family.

Yet another theory of railway rates has been put forward. They ought to be, it is said, based on 'postal principles'; that is, there should be, irrespective of distance, one universal rate as for a penny letter. Some reformers indeed, feeling that this, their ideal, was difficult of attainment, have been ready to temporize with existing practice and to be content with three zones of short, middle, and long-distance traffic respectively, within each of which one uniform fare or rate should be charged. A desire to conciliate a considerable movement of public opinion in favour of this latter idea was largely responsible for the introduction in 1889 of the famous Hungarian zone-systems, which, however, contained at the outset fourteen zones instead of only three, and which has since its introduction been repeatedly modified, and always in the direction away from the postal principle of uniformity.

[1] It may of course be said that an equal rate of, say, 30*s.* to Cheshire and Liverpool alike would be fairer to the customers and just as profitable to the railway. So far as this argument deals with the very difficult question of 'undue preference' between rival customers of the railway, it must be reserved for future discussion. But here it may be said that *ex hypothesi* the proposed course is impossible. We are bound to assume that in its own interest the railway charges the American meat all it can be got to pay. The low rate was put in force, because at a higher rate the meat went by sea to London. On the facts of the individual case this may not be so. In that case the officers of the company made a mistake and sacrificed unnecessarily a portion of their possible net profit, just as any merchant might do who failed to appreciate market conditions. A distinguished French writer, Colson (*Transports et tarifs*), suggests that in cases of this kind a self-registering gauge of the proper height of the exceptional rate is to be found in the fact that the sea route obtains or retains some portion of the traffic.

Now to a so-called zone-system there can be no abstract objection. In fact, every railway undertaking that ever existed or is likely to exist has or will have a zone-tariff. In ordinary cases the zone is one mile, or one kilometre as the case may be, for short-distance traffic; while in most countries, when the distances get longer, the unit of charge for goods traffic, and sometimes for passenger traffic as well, becomes three or five or ten or even more miles or kilometres. That the Hungarian system, even for short distances, treats ten kilometres as an indivisible unit involves no special principle; it is merely a matter of administrative convenience. It simplifies somewhat the checking of tickets, and economizes to a trifling extent in printing and book-keeping. On the other hand, it excites discontent rather than promotes satisfaction. A fare being charged for, say, thirty kilometres, no one gets anything more than he has paid for; the man who only wishes to travel twenty-one kilometres gets a good deal less. But if the Hungarian administration regards the convenience as worth purchasing at the price, there is no more to be said.

The real point is one of principle. *Prima facie*, and other things being equal, a tariff ought to be based on mileage, and the more accurately it is so based, the fairer it is both to the railway and to its customers. Every extra 100 yards the traffic is carried means an extra service to the customer for which, in equity, he ought to pay; it means also an extra expenditure by the railway company—both in capital spent, carriage performed, and plant and organization maintained for the purpose—for which, in equity, it ought to be paid. The postal analogy is entirely misleading. In dealing with a letter, cost of conveyance is only a fraction of the total cost, which is mainly incurred for sorting and distribution. Almost the whole cost of passenger traffic and a large part of the cost of goods traffic is conveyance cost, using the phrase in the broad sense of all cost other than terminal. Postal cost of conveyance, moreover, is wholly independent of distance. It undoubtedly costs more to carry a letter from one Sutherland village to another in a different glen than to carry it from Wick to London. To say that it costs the railway more, if the passenger from Wick gets out at Golspie instead of going on to London, would be obviously absurd[1].

The foregoing argument tends to show that railway rates must be broadly based on mileage. And we shall be strengthened in our belief in the correctness of our theoretic argument, when we remember that as a fact, always, everywhere, on state lines equally with private railways, they are and have been so based. But we have also seen that equal mileage rates are an impossibility, and that deviations from such equality cannot be referred to any principle of charging according to cost of carriage. Further, we have seen that rates far below the normal scale may still be profitable, even exceptionally profitable, and that rates would have to be cut almost to a vanishing point before it could be said that the traffic to which they were applied was carried at the expense of other traffic.

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[1] Apart from principle, postal tariffs are impossible for practical reasons. The Post Office can average its 1*d*. charge, partly because the charge is so small that, even when it is most excessive (having regard to actual cost), the excess is too trifling to rouse objection, but mainly because it is protected by its statutory monopoly from the competition of halfpenny town-posts for its most profitable business. But railways have no such monopoly, and their average fare is not trifling. It is in the United Kingdom roughly 2*s*., 10*d*., and 6*d*. for the three classes respectively. That long-distance passengers would welcome a charge on 'postal principles' need not be said. But what passenger from Oxford Street to the Bank, or from Charing Cross to the Mansion House would pay the average fare? Naturally, some hundreds of millions of passengers would drop out. Their fares being lost, the railways would be forced to raise the average fare to recoup the loss, say to 3*s*., 1*s*. 3*d*., and 9*d*. Again, a couple of hundred million passengers would go. Again the average fare would have to be raised, and so on *da capo*.

But to say that rates must be based broadly on mileage does not carry us far, if, as we have seen, it seems reasonable that traffic in the same articles for the same distance over the same line should be carried simultaneously at rates which compare to each other in the ratio of 1*d.* to 2½*d.* per ton per mile. Somehow we must get closer to the principle on which rates are actually fixed. Probably we shall do so best by adopting the historical method.

CHAPTER VII

RAILWAY INCOME

ITS HISTORICAL DEVELOPMENT

THE earliest English railways, the tramways and plateways and railroads on Tyneside, were merely what modern railway parlance would term 'mineral lines.' They were built to carry coal and nothing but coal; practically speaking, they carried no goods, certainly no passengers. The first passenger line was the Liverpool and Manchester, opened in 1830. It was promoted primarily to carry goods; as a matter of fact passengers flocked to it in such numbers that, for some time after the opening, the goods were crowded off the road. A dozen years later, when the bulk of what are now the great trunk lines had been opened, three-quarters of the total railway revenue was derived from passengers, only one-quarter from goods. On the trunk lines themselves, the Great Western or the London and Birmingham, the proportion of goods receipts was more like a fifth or a sixth of the whole. Gradually, the goods gained on the passengers till, in the early 'fifties,' they represented more than half the receipts. Beyond this point they have not gone very far since. Twenty years ago the ratio got as high as 55 to 41 per cent.; latterly it has been about 51 to 43 per cent.[1].

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[1] It should be noted that 'passenger traffic receipts'—meaning in the Board of Trade Returns receipts not only

Now what are the historical facts that lie behind these figures? The passenger traffic of the 'forties' represents well-to-do people, customers transferred in great measure from post-chaises and stage-coaches, and paying fares averaging fully 2*d.* per mile. There were 18 000 000 of them in 1842, only a handful of whom travelled third class. Sixty years later the passengers, including season-ticket holders, had increased to 1 500 000 000; nine-tenths of them travelled third class, and the average fare per mile had fallen from 2*d.* to under ½*d.*, less than one-fourth[1]. What does this mean? The well-to-do people, the customers whom the railway found ready made for them, have increased largely in number, in wealth, and in the habit of travel. They account perhaps for 180 000 000 journeys against 18 000 000 sixty years ago, and they still pay fares not greatly below the original 2*d.* Meanwhile, fares, gradually and steadily descending from the original 1½*d.* a mile third class, through the Parliamentary 1*d.* a mile, first by one train a day and then by all trains, down to modern excursion and workmen's fares ranging as low as five miles for a 1*d.*, have brought into existence an absolutely new traffic, in the main of classes that two generations ago never travelled at all, representing 1 300 000 000 passenger journeys per annum.

That the trunk lines sixty years ago carried very

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from passengers, but from passenger trains—include, parcels, mails, horses, fish, &c. The balance required to make up the 55 + 41 and the 51 + 43 given above to the full 100 per cent. of revenue represents the miscellaneous, i. e. non-railway revenue of the companies.

[1] This is on the assumption that the passenger-mile figures for August, 1903, published by the North-Eastern Railway, are fairly typical of the country generally, as I see no reason why they should not be.

little goods traffic need not surprise us. The superiority of an express train over a post-chaise is overwhelming, but a goods train has no such crushing advantage over a canal barge or a coasting steamer. The barges are not quite, and the coasting steamers are a long way from being, crushed even yet. In the early days, with puny and extravagant engines, with no signalling system, rudimentary hand-brakes and a considerable and profitable passenger traffic, the difficulty of working a line crowded with trains was so great that railway managers had no great temptation to try and attract low-class traffic from rival carriers by making low rates. What traffic they got was of small bulk and high class, to which speed was of more importance than cost. The exclamation of the London and Birmingham Railway director, when it was suggested to him that his highly aristocratic line should carry coal to London in competition with the Grand Junction Canal and the Newcastle coal-brigs—'Coal! Why they'll be asking us to carry dung next!'—may or may not be apocryphal, but represents a real and not unjustifiable attitude of mind. And indeed had it been possible for the London and Birmingham to remain as it began, a great through line, with no extensions and no branches to dilute its profits, it might well have gone on to this day untroubled with low-class innovations such as coal and third-class passengers, and yet have continued to pay without difficulty to its shareholders its original dividends of 10 per cent.

But fortunately for the country, if not for the shareholders, such a policy was impossible for any of the great companies. In self-preservation they were compelled to occupy the territory on either side of their main line of communication. And new capital expenditure on new and unproductive branch lines needed new sources of revenue to meet it. The high-class traffic that had come as of course was exhausted. New traffic had to be obtained somehow, and the only way to obtain it was to charge lower rates. For the fact that the railway was not carrying it showed that it could not or would not pay the existing rates. If coal, for instance, be worth 10*s.* at the pit in South Staffordshire and 20*s.* on the railway wharf in London, evidently the coal merchant cannot afford to pay a railway rate of more than 10*s.* Equally evidently, though the London selling price be 20*s.*, the coal merchant will not pay a railway rate of 10*s.* if the canal rate is only 7*s.* 6*d.* So new rates had to be made, differing widely in that some of them were specially made to attract traffic that otherwise would have gone by other routes, others were general for the benefit of goods that otherwise could not profitably travel at all, but all alike in that they represented large reductions on the rates previously in force.

Such in broad outline is the history of the development of railway traffic and railway tariffs in this country. In its main features it represents the history of railway development everywhere. The railway begins with a small volume of high-class traffic at high rates. Its constant tendency is to increase the volume of traffic by successively lower rates tapping successively lower strata of traffic. The traffic attracted by such rates is partly drawn from previously existing but less efficient modes of conveyance, partly created by the new railway facilities. As the traffic increases, the average rate comes down, and as the rate comes down the traffic increases. And so the reciprocal process goes on, up to the point where the railway has got all the traffic it can afford to take. The point at which reduction stops is where it only just pays to get the traffic; that is, when the extra cost of dealing with the lowest rated traffic is all but equal to the earnings from it[1].

American history affords a typical instance of this process of development. As early as 1825 the Erie Canal furnished in conjunction with the Hudson River what was, for its time, a highly efficient route from the Great Lakes to the Atlantic seaboard at New York. A through railway route was completed from New York to Buffalo, practically paralleling the river and the canal all the way, by the year 1842. But it was not till 1853 that the railway began to compete seriously for the canal traffic. At that time the traffic on the canal was so great that the tolls, though by successive reductions they had been brought down to one-third of their original figure, were yielding to the State of New York, which owned the canal, an annual profit of over 50 per cent. on the original capital outlay. And at this stage the commanding personality of Commodore Vanderbilt appeared on the scene. He bought up the various independent companies—there had originally been fourteen of them—which owned the continuous railway route, and amalgamated them into one concern, the New York Central Railroad, and then he put in force through rates low enough to attract traffic from the canal. The traffic came, enabling him thereby to spread the fixed costs of his railway over a greatly increased volume of traffic. Cost per unit of traffic being thereby lowered, the way was clear for a further reduction of rate. The rate being reduced, again a further volume of traffic was drawn from the canal, and again the railway could afford to reduce its rates. Gradually the canal profits dwindled and disappeared. The State of New York, in vain endeavour to retain traffic on their canal, assumed the whole charge for maintenance and abolished tolls. Nothing could arrest the decline of the canal.

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[1] This point, which might be called the marginal rate, will evidently be sooner reached in an old, densely populated country like England, where widening of lines and extension of stations are exceedingly costly, and where working costs are, for many technical reasons, unusually high, than in a new country like the United States where these conditions are reversed.

To-day its traffic is a practically negligible quantity, and the people of New York State are committed to an expenditure of £20000000 sterling on widening and deepening the canal, so as to make it navigable for barges of 1000 tons burden, in the hope of thereby restoring to it some measure of its former importance.

Meanwhile, though competing railways innumerable have come into existence all round it, the New York Central is earning a splendid income by carrying a volume of traffic many times that which would have blocked and congested the old canal at rates per ton per mile averaging probably a sixth of those which it charged half a century ago. Nor is this all. For if it was the existing traffic which the railway annexed from the canal that first enabled the railway company to reduce their rates, it was the reduction of those rates which made possible the settlement of the great grain-fields of the North-West, and so assured to the railway the development and continuance of a new traffic beyond the utmost dreams of the early railway managers.

But it must be noticed at this stage that, while the average rate necessarily comes down as the traffic of a railway develops—and this for two reasons: because lower rates are introduced, and because the volume of traffic at those lower rates steadily becomes a larger proportion of the whole—it by no means follows that the highest rates are reduced. The first-class fares from London to Dover are higher to-day than they were when the line (then thirteen miles longer) was opened sixty years ago; and it is probable that the rates for the highest class of goods, such as cigars or silks, are as high to-day between Liverpool and Manchester as they ever were.

In the nature of things this is only to be expected. No one—not even a railway manager—gives away money as a business transaction. The manager who reduces a rate on coal, or a third-class fare, does so hoping that traffic will be so stimulated that there will be a greater net profit on the larger traffic at the lower rate than there was on the smaller traffic at the higher rate. His expectation may be disappointed[1], for all reductions do not stimulate even cheap traffic; his reductions may have been unduly great, the gains may not cover the losses; for, whatever railway critics may say, the Irish applewoman's principle, that you can afford to sell each apple at a loss if you only sell enough, is not universally true. But it was on this expectation that the manager acted.

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[1] In 1889 the Hungarian Government introduced in their zone-system very considerable reductions in passenger fares. The following year the Austrian Government was constrained to follow suit with its so-called 'Kreuzer-tarif.' The loss of net revenue in Austria was so great that a large part of the concessions were almost immediately withdrawn, and further increases have been made since. Even in Hungary the not unimportant changes in the zone-system since 1889 have all been in the direction of either withdrawing facilities or increasing charges. Denmark, again, imitated Hungary with a reduced passenger tariff. Recently the Government have been compelled to introduce a new passenger tariff, implying, so it is reckoned, an average increase of something like 30 per cent.

Now no one can suppose that a reduction of the Dover first-class express fare from 19*s.* to 10*s.* would induce a single human being to spend a month on the Riviera or to choose the overland route to India. Nor would 10*s.* per ton off the railway rate for cigars—worth from £2000 to £7000 a ton—tend to stimulate their consumption in Manchester.

If high-class rates, whether for goods or passengers, are reduced, the cause is practically always competition in some form or other. If the fares to Paris via Newhaven are reduced, Dover may have to follow suit or lose an appreciable part of its traffic. A line of direct steamers from Havana to Manchester might well bring down the rate for cigars from Liverpool. For railway customers are no more apt than railway managers to give something for nothing; and, however well able the cigar traffic may be to bear a rate of, say, 18*s.* per ton, the cigar merchant will not pay it if he can get his cigars carried for 8*s.* and add the 10*s.* to his own profits.

But a difference between passenger and goods traffic should be here noted. Goods are classified by the railway company in a manner which must be discussed more in detail presently. Cigars, if they are to be carried at all by the railway, must pay the rate fixed as suitable for the class to which they belong. With passengers this is not so. Passengers classify themselves; and accordingly first, second, and third-class carriages on the same train in a very real sense compete with one another for the custom of the potential passenger. Many a man who is perfectly able to pay first-class fare, and who would never dream of refraining from travelling if the minimum fare were 3*d.* per mile, asks himself when he goes to a station in which class he will get best value for his money, and journeys now in one class, now in another, according as the personal considerations of the moment may affect him. A first-class passenger fare of 2*d.* per mile may therefore prove in practice the highest rate that can profitably be charged in this country. For while at 3*d.* per mile probably not more than five passengers in every hundred will refrain from travelling third-class, at 2*d.* per mile twelve passengers may refrain from doing so. In the former case the railway only receives 10*d.* above third-class fare; in the latter case it receives 12*d.*, and the extra 2*d.* more than covers the extra cost. The result of this difference in the nature of passenger and goods traffic is that, while a normal English goods tariff per ton for a distance of, say, twenty miles may rise from, say, 1*s.* 3*d.* in the case of coal to 11*s.* in the case of cigars[1], the difference in the case of ordinary passenger fares is only between a minimum of 1*s.* 8*d.* and a maximum of 4*s.*[2]

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[1] Including terminals in both cases, and assuming no charge to be made for cartage.

[2] The truth of the point made in the text is well shown by the history of these very Dover fares. For many years the first-class express fare was £1, the first-class ordinary fare 18*s.* 6*d.* Nowadays the express fare, which has been reduced by Parliament to 19*s.*, is only charged on the

We are now in a position to summarize our conclusions. The highest rates charged nowadays represent the rates made in the infancy of railways to attract from earlier means of conveyance, stage-coaches and stage-wagons, the high-class traffic with which alone they dealt. Since then, by successive introduction of lower and lower scales of rates, the railway net has swept in new traffic, now from new and more distant areas, again in commodities of lowest value, and yet again in commodities that, owing to exceptional advantages of situation, could only be attracted from rival means of conveyance by exceptional concessions.

through continental trains, which do not carry third-class passengers. Practically it is not a local fare at all, but a portion of a through rate charged to passengers who are going abroad and likely to continue their journey by trains which are confined to first-class passengers. The ordinary fares charged by local trains between Dover and London, some of which are faster than the so-called 'expresses,' and all of which of course carry third-class passengers, are 13*s.* first-class, and 6*s.* 5½*d.* third. It is safe to assume that the railway company makes more profit out of carrying local first-class passengers at the modern fare of 13*s.* than at the old fare of 18*s.* 6*d.*

It is interesting to note that in Germany and its neighbouring countries, where abstract theory has had much more influence on rate-making than it has ever had in England, first-class fares have been maintained at a point so high in proportion to those in the inferior classes that only a mere fraction of travellers pay them. Thereupon the critics said, 'there are three first-class compartments for each passenger, while there are three third-class passengers for each compartment; in fairness the first-class passenger should be charged more, or the third-class less.' So the first-class fares were raised still higher, the traffic became more microscopic than before, and naturally even less profitable. Now the tendency is to abolish first-class carriages altogether. But had the fares been lowered rather than raised, judging by English experience, it is probable that both the would-be first-class passengers and the railways would have profited.

The principles underlying this policy—a policy which, be it once more repeated, is common to all railways, whether owned by the State or by private companies—may be said to be three:—

I. Get traffic. The more traffic carried, the less it costs to carry. Therefore, first and foremost, get traffic.

II. Charge no rate so high as to stop the traffic from going: subject to

III. That no rate shall be so low as not to cover the additional cost incurred by the railway in dealing with the traffic to which the rate applies.

Principles I and II are, it will be observed, intimately co-related: for a reduced rate which would imply an actual loss on a given volume of existing traffic may be quite profitable if the reduction doubles the volume of traffic to which the rate applies.

Further, it will be seen that principles II and III fix the maximum above which and the minimum below which rates cannot be carried. There is, however, a gap in No. II, of some theoretical though of little practical importance. Millionaires and bullion are left *corvéables à discrétion*. For clearly, first-class fares and rates for the carriage of bullion might be raised manifold above their existing level before a London financier would be induced either to travel himself or to send his gold remittances by cargo steamer from the Thames to New York, rather than pay the railway charge from London to Liverpool or Southampton. The truth is that millionaires and bullion constitute so small a portion of the total traffic that to the railway they are a negligible quantity. Even were they not, as they are, protected in practically every country by positive legislation from exceptional and extortionate charges, it would still not be worth while for the railway to endeavour to place them in a separate category.

Reverting to the serious question, we have a maximum rate fixed by capacity to pay, and a minimum rate fixed by the price at which the railway, regard being had to the volume of traffic actual and potential, can afford to take business. These two points are, speaking broadly, ascertainable with sufficient accuracy for practical purposes by investigation and inquiry. But they are very far distant from each other. The railway manager has no exact standard to guide him in fixing an actual rate at any point between the two extremes. Is he cautious and conservative by temperament, or is he placed in a country such as Ireland, with decaying industries and diminishing population, he naturally tends to hug the uppermost limit. If, on the other hand, he is of sanguine disposition, still more if he is in the midst of a rapidly progressive community, or in a country with boundless possibilities such as the United States, he equally naturally tends to venture the present in view of the potentialities of the future. Both men are actuated by the same motives. Each desires for his railway—subject to limitations which have been partially suggested already and which will have to be dealt with more at length hereafter—the maximum net receipts. But the one aims to reach his end by making a large profit on a small business, the other sees a fortune in obtaining a marginal profit on a huge turn-over.

Clearly the former method gives least trouble to the management; the latter is most to the benefit of society at large. But unless the one tendency or the other is pushed to an obvious extreme, no one can say positively that either manager is right or wrong. There is no norm to which a particular railway rate ought to conform. It passes the wit of the most experienced official of the executive government, of the most learned judge of a railway tribunal, to decide whether a given rate of, say, one penny per ton-mile is *per se* reasonable, or whether $\frac{15}{16}d$. or $1\frac{1}{16}d$. would be more or less reasonable. Fixing a railway rate is, in one word, an art not a science, and it is an art which, in Bagehot's phrase, must be exercised 'in a sort of twilight, . . . in an atmosphere of probabilities and of doubt, where nothing is very clear, where there are some chances for many events, where there is much to be said for several courses, where nevertheless one course must be determinedly chosen and fixedly adhered to.'

So far we have imagined the railway manager fixing an individual rate. But in reality his task is immeasurably more difficult than this. He has to fix, not one rate, but thousands and millions of rates. The classification of merchandise in a highly developed country like England or France or the United States contains some thousands of entries, and to each item its relative place has to be assigned. This matter must be dealt with in more detail hereafter. For the present, it is sufficient to note that careful attention must be paid to the ratio of charge on articles competing with or capable of being substituted for each other; to the scale of decrease in the charge per mile, as distance increases; of decrease per ton as the weight of consignment increases, and so forth.

In truth, though we have personified the management and imagined a man fixing a complete system of railway rates, no one man, and indeed no combination of men, could erect such a system offhand from the foundations. It can only grow gradually, developing here and changing there, as the country itself develops, and its industry and trade are modified by time and circumstance. But the guiding idea of the management remains the same throughout. Each rate has, as we have seen, its own maximum and minimum. All the rates must among them cover all the expenses and leave, if possible, sufficient margin to pay interest on capital at the normal rate. *Inter se*, the rates must be so adjusted that each item of traffic bears its fair share of the total cost of the entire railway service.

But what is 'its fair share'? In the familiar railway phrase the answer is, that the manager endeavours to charge each category of traffic 'what the traffic will bear.' The idea is fundamental; the practice is universal. A more detailed examination is therefore necessary. In the following chapters we shall accordingly consider, first the meaning of the phrase 'charging what the traffic can bear'; secondly, how far this method of charge is equitable; and thirdly, by what machinery it is put into practical application.

CHAPTER VIII

CHARGING WHAT THE TRAFFIC WILL BEAR

THE MEANING OF THE EXPRESSION

THE phrase 'charging what the traffic will bear' has, for some not very obvious reason, undoubtedly acquired an ill repute. On the face of it, it surely seems to represent a principle, not of extortion, but of moderation. To charge what the traffic can bear is, in other words, not to charge what the traffic can not bear. Yet the phrase is commonly understood quite differently. It has been asserted that railway managers claim to estimate for themselves production cost at *A* and selling price at *B*, and to appropriate as railway rate the entire difference. Even a sober writer like Mr. Jeans declares that 'the railway companies make no secret of the fact that, in cases where there is little or no competition compelling a different course, their guiding principle is imposing on the traffic just as much as it will bear[1].' The truth is that, whatever rash and unqualified statements may have been made by individual railwaymen under particular circumstances—a famous French manager, M. Aucoc, is reported to have declared: *Faites payer au trafic tout ce qu'il peut payer; tout autre principe est un nonsens*—no railway administration has ever acted on any such principle. For instance, at the moment of writing (April, 1904) the Chancellor of the Exchequer has increased the tax on imported cigars by 1*s.* per lb., which equals £112 per ton. Cigars, that is, are believed to be able to bear this extra rate, though they are taxed at over £600 per ton already. Can any reasoning being imagine that a rate of perhaps £3 per ton for carriage from Liverpool to London approaches the limit of what the traffic can bear?

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[1] *Railway Problems.* London, 1887, p. 283.

The real meaning of the phrase is that, within the limits already described—the superior limit of what any particular traffic can afford to pay, and the inferior limit of what the railway can afford to carry it for—railway charges for different categories of traffic are fixed, not according to an estimated cost of service, but roughly on the principle of equality of sacrifice by the payer. So regarded, 'what the traffic will bear' is a principle, not of extortion, but of equitable concession to the weaker members of the community. Had railway managers in the past declared that their principle was 'tempering the wind to the shorn lamb,' their descriptive accuracy would have been equally great, while their popularity might have been even greater. Somehow, the total cost of maintaining and operating the railway has to be paid for; broadly and in the long run, the capital invested in railway construction must be remunerated at the normal rate of interest[1]. Can any system of apportionment of this necessary expenditure be more equitable than one under which the rich—well-to-do passengers, valuable freight, traffic with the advantage of geographical situation close to the markets, and the like—contribute of their abundance; while the poor—third-class passengers, bulky articles of small value, traffic that has to travel far to find the market, and so forth—are let off lightly on the ground of their poverty? Translated into railway language, the principle means this: the total railway revenue is made up of rates which, in the case of traffic unable to bear a high rate, are so low as to cover hardly more than actual out-of-pocket expenses; which, in the case of medium-class traffic, cover both out-of-pocket expenses and a proportionate part of the unapportioned cost; and which finally, in the case of high-class traffic, after covering that traffic's own out-of-pocket expenses, leaves a large and disproportionate surplus available as a contribution towards the unapportioned expenses of the low-class traffic, which such traffic itself could not afford to bear.

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[1] We shall see later on that, though the rates charged on an individual line may be independent of its capital cost, the capital invested in the railway system of an entire country, regarded as one whole, has to receive interest, if not out of railway rates, then out of general taxation.

This, in principle and in outline, is the system of charging what the traffic can bear. It is the system which—the point must be reiterated—is, always has been, and, as far as we can see, always must be adopted on all railways, whether they be State enterprises or private undertakings[1]. It is a system at once in the interest of the railway, because even the lowest class traffic, by whatever small amount its rates exceed the additional cost of doing the business, contributes to the general expenses of the undertaking; in the interest of the public, because traffic is thereby made possible which could not come into existence at all, if each item of traffic was required to bear, not only its own direct expenses, but its full share of all the standing charges; and in the interest of the high-class traffic, because everything which the low-class traffic pays beyond its own actual out-of-pocket cost helps to defray the general expenses of the undertaking, which otherwise the high-class traffic would have to bear unaided.

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[1] The German railways at one time, largely under the influence of abstract theorists, turned aside from this system. For practical purposes they have long ago reverted to it, though the form of their tariffs still sometimes leads superficial observers to imagine that their rates are based on cost rather than on value of service. As to the German tariffs, however, there will be more to be said presently.

The Inter-State Commerce Commission of the United States, whose original chairman was Judge Cooley, one of the greatest constitutional lawyers America has ever had, were forced at the outset of their work in 1887 to consider the question whether rates, avowedly based on what the traffic would bear—or, in other words, not on cost but on value of service—could be regarded as equitable. And they expressed their conclusion in their First Annual Report to the following effect:—

'It was very early in the history of railroads perceived that, if these agencies of commerce were to accomplish the greatest practicable good, the charges for the transportation of different articles of freight could not be apportioned among such articles by reference to the cost of transporting them severally; for this, if the apportionment of cost were possible, would restrict within very narrow limits the commerce in articles whose bulk or weight was large as compared with their value. On the system of apportioning the charges strictly to the cost, some kinds of commerce, which have been very useful to the country, and have tended greatly to bring its different sections into more intimate business and social relations, could never have grown to any considerable magnitude, and in some cases could not have existed at all, for the simple reason that the value at the place of delivery would not equal the purchase price with the transportation added.

'The traffic would thus be precluded, because the charge for carriage would be greater than it could bear. On the other hand, the rates for the carriage of articles which within small bulk or weight concentrate great value would on that system of making them be absurdly low when compared to the value of the articles, and perhaps not less so when the comparison was with the value of the service in transporting them. It was, therefore, seen not to be unjust to apportion the whole cost of service among all the articles transported upon a basis that should consider the relative value of the service more than the relative cost of carriage. Such method of apportionment would be best for the country, because it would enlarge commerce and extend communication; it would be best for the railroads, because it would build up a large business; and it would not be unjust to property owners, who would thus be made to pay in some proportion to benefit received. Such a system of rate-making would in principle approximate taxation; the value of the article carried being the most important element in determining what shall be paid upon it.

. . . . . .

'To take each class of freight by itself, and measure the reasonableness of charges by reference to the cost of transporting that particular class, though it might seem abstractedly just, would neither be practicable for the carriers nor consistent with the public interest.

The public interest is best served when the rates are so apportioned as to encourage the largest practicable exchange of products between different sections of our country and with foreign countries; and this can only be done by making value an important consideration, and by placing upon the higher classes of freight some share of the burden that on a relatively equal apportionment, if service alone were considered, would fall upon those of less value. With this method of arranging tariffs little fault is found, and perhaps none at all by persons who consider the subject from the standpoint of public interest.'

But though it is not difficult for a dispassionate outsider, regarding the question as merely one of abstract economics, to satisfy himself not only that the principle of charging what the traffic can bear is in itself equitable, but also that it has commended itself to disinterested public authorities equally as to commercially-minded managers of private dividend-seeking undertakings, it cannot be denied that the lay public regard the principle with suspicion and even with aversion. A railway manager may perhaps convince a plain man that it is reasonable and in the public interest to charge 6*s.* per ton for a 20-ton consignment of butter from Southampton to London, and 12*s.* per ton for a 3-cwt. consignment from Winchester; but to satisfy him that it may be reasonable and in the public interest to carry identical consignments of the same goods, and to make the charge 10*s.* for 100 miles, but only 7*s.* provided that the goods travel a further 50 miles, is a much more difficult task. And yet there are cases where the facts are so clear and so simple that even traders, who are apparently discriminated against, are constrained to admit the justice of their treatment. Here is an instance which actually occurred[1]:—

'On the coast of Delaware a few years ago there was a place, which we shall call *X*, well suited for oyster-growing, but which sent very few oysters to market because the railway rates were so high as to leave no margin of profit. The local oyster-growers represented to the railroad that, if the rates were brought down to one dollar per 100lb., the business would become profitable, and the railroad could be sure of regular shipments at that price. The railroad-men looked into the matter. They found that the price of oysters in the Philadelphia market was such that the local oystermen could pay one dollar per 100lb. to the railroad and still have a fair profit left. If the road tried to charge more, it would so cut down the profit as to leave men no inducement to enter the business. That is, those oysters would bear a rate of $1 per 100lb. and no more. Further, the railroad-men found that if they could get every day a car-load, or nearly a car-load, at this rate, it would more than cover the expense of hauling an extra car by quick train back and forth every day, with the incidental expenses of interest and repairs. So they put the car on, and were disappointed to find that the local oyster-growers could only furnish oysters enough to fill the car about half full. The expense to the road of running it half full was almost as great as running it full: the income was reduced one-half. They could not make up by raising the rates, for these were as high as the traffic would bear. They could not increase their business much by lowering rates. The difficulty was not with the price charged, but with the capacity of the local business. It seemed as if this special service must be abandoned.

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[1] Hadley, *Railroad Transportation: its History and its Laws.* Putnam & Sons, New York and London.

'One possibility suggested itself. Some distance beyond *X*, the terminus of this railroad, was another oyster-growing place, *Y*, which sent the oysters to market by another route. The supply at *Y* was very much greater than at *X*. The people at *Y* were paying $1 per 100lb. to send their oysters to market. It would hardly cost 25 cents to send them from *Y* to *X*. If the railroad from it to Philadelphia charged but 75 cents per 100lb. on oysters which came from *Y*, it could easily fill its car full. This was what they did. They then had half a car-load of oysters grown at *X* on which they charged a dollar, and half a car-load from *Y* on which they charged 75 cents for exactly the same service.

'Of course there was a grand outcry at *X*. Their trade was discriminated against in the worst possible way—so they said—and they complained to the railroad. But the railroad-men fell back on the logic of facts. The points were as follows: (1) a whole car-load at 75 cents would not pay expenses of handling and moving; (2) at higher rates than 75 cents they could not get a whole car-load but only half a car-load, and half a car-load at $1 rate (the highest charge the article would bear) would not pay expenses. Therefore (3) on any uniform rate for everybody the road must lose money, and (4) they would either be compelled to take the oyster-car away altogether or else get what they could at a dollar and fill up at 75 cents. There was no escape from this reasoning, and the oystermen of X chose to pay the higher rate rather than lose the service altogether.'

This case was very unusually simple. There was in question only a special rate on a single commodity between two defined points. The traders concerned were a small number, and could be dealt with individually and directly. But take a case such as the following.

By the Great Eastern Railway, which goes in an almost direct line, Yarmouth is 121 miles, Norwich is 114 miles, and Cromer is 138 miles from London. But there is another route via the Great Northern from King's Cross which, passing Peterborough, 76 miles, and Lynn, 115 miles, turns east along the north coast of Norfolk and reaches Cromer in 160 miles, Norwich in 167 miles, Yarmouth in 187 miles. And not only is this latter route a good deal longer to Cromer and very much longer to Norwich and Yarmouth, but all along its course from Lynn on the west to Cromer on the east it is cut by direct Great Eastern lines from London. The result is inevitable. Unless the Great Northern route goes out of the through business altogether, agreeing not to compete (probably being given a *quid pro quo* by the Great Eastern elsewhere), its possible rates for London traffic are fixed for it. Their highest point will be somewhere near Cromer, based on the Great Eastern London-Cromer distance, and they will fall westwards towards Lynn and southwards towards Norwich and Yarmouth. In other words, no additional charge will be made for carrying the traffic the last fifty miles of its journey to Yarmouth. But this applies to London only. Intermediate places on the Great Northern, say Hatfield or Hitchin, have not the Great Eastern route available. They must send their traffic—goods, not passengers, for passengers can route themselves by breaking the journey at Cambridge —by the Great Northern circuitous route. For such traffic the rates, we may assume, will rise on a normal mileage basis, and therefore from Hitchin to Yarmouth, 155 miles, the rates will be considerably higher than if the railway company had received the traffic in London, and had had to carry it 32 additional miles before it reached Hitchin.

We may assume that, if a trader at Hitchin happens to discover this, he will be indignant. Certainly, on the face of it, he appears to be badly treated. But is it so in reality? Are there any special circumstances entitling him to be charged less than the normal mileage rate? If not, he cannot complain; he is only charged on actual distance. Is the Yarmouth traffic carried 'at his expense'? No. For we have seen that, even with rates far below the average, it is yet more profitable to the railway to carry traffic than to lose it altogether. Is the Great Northern Company enabling the London trader to obtain an undue advantage over his competitor at Hatfield or Hitchin? Again, no. The London trader has access to the short and direct route. There is no reason why he should pay any more than the rates natural to that route. Hitchin's only route to Yarmouth is a circuitous one. This may be Hitchin's misfortune, but is not the fault either of the London trader or of the railway company. On the whole, there seems no reason to doubt that the railway company is entitled to carry the traffic past Hitchin to London for considerably less than nothing[1].

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[1] And yet what the Americans call 'a long and short-haul clause'—a clause, that is, providing that the rate for

It will now be seen that the phrase 'the rate which the traffic *can* bear' has two meanings. 'Can bear' may mean simply 'is able to bear,' as in the case of the oysters at X, which at a higher rate would have simply been shut out of the market; but may also mean, and very often does mean, 'Can be made to bear.' Clearly, if between two points, 100 miles apart in direct distance, there are two railways respectively

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the shorter distance, included in a longer distance, shall never be higher than for the longer distance, other things being equal—is frequently found in American legislation and in continental executive regulations. In this case, if the through traffic is of such magnitude and importance that the railway company cannot do without it, the intermediate stations obtain an advantage to which they are not equitably entitled. If the through traffic is not of such importance, the railway company simply abandons the business to the rival company with the shorter road, or, it may be, to the competitor by canal or coasting steamer. In such case the railway company suffers, for it loses a profit, though possibly a scant one; the traders at its intermediate stations suffer, for there is no through traffic left to contribute to the general expenses of the railway on which they are wholly dependent. The rival railway or canal or steamer gains; the traders at the intermediate stations of the rival railway, if a railway is the competitor, tend to gain also; the terminal traders are as they were, except so far as they may lose the advantage of competition—in facilities, not rates—between two companies.

I have ignored in the text the fact that under the English law, as it has existed since 1888, a trader at Hitchin might apply to the Railway Commission to enforce a through rate via Great Northern to Cambridge and thence via Great Eastern. For, in the first place, the law is practically inoperative here. Secondly, there is no analogy to it to be found either in American law or in continental executive regulation. Thirdly, if the arguments of the text are sound, Section 25 of the Railway and Canal Traffic Act, 1888, though good law, is, so far as this point is concerned, bad economics, and it is with economics, not law, we are concerned here.

100 and 150 miles in length, the longer line cannot obtain a higher rate than the shorter. Or again, if there is a direct railway and a roundabout route of 200 miles by sea, the railway can only obtain such a rate as represents the average sea freight with a surcharge for the extra safety, speed, regularity and convenience which the railway affords. It will be found that it is when 'can bear' is meant in the latter sense, in other words, when the question of competition arises either with water or rival railways, that the real difficulty occurs. Economic argument, commercial instincts, seem to point one way. The sense of justice of the ordinary citizen seems to point the other. And the success of legislatures and law courts in reconciling the conflicting ideas has not hitherto been conspicuous.

Perhaps one main reason why the justice of the principle of charging what the traffic will bear is not more readily conceded is to be found in the fact that this principle is regarded as something exceptional—a claim made in reference to railway business only, on the ground of a supposed generic difference between railways and other businesses. The truth would rather seem to be that railways are only typical of the great modern business organizations. They came first, and their methods of charging, almost from the outset, differed profoundly from those of the contemporary small trader, to whom cost *plus* a profit represented both an ascertainable and an obtainable price. In industrial undertakings nowadays 'cost' is a very indeterminate figure; 'profit' varies still more widely, both as between different parts of the same business, and in reference to the business as a whole. The public opinion of society at large still, however, assumes that the old principles govern. Most people probably have had personal experience of travelling from *A* to *B* with an ordinary ticket costing, say, £1, and finding that a fellow passenger in the same carriage has obtained a Friday to Tuesday return ticket for only a few pence extra. And most people have, therefore, felt that they were being unfairly treated. If the railway could afford to carry a passenger to *B* and back again for 20*s.* 6*d.*, 20*s.* must, they have instinctively argued, give an extortionate profit on the single journey. And if the cost of carrying a single passenger were a determinate figure, and if to that cost it was always possible to add a fixed percentage representing an average and reasonable profit, the criticism would be just. But, as both hypotheses are unsound, the criticism fails. There was, says an American writer, a 'hotel in Arkansas whose proprietor charged each guest the expenses of the house since the last one left, and collected with a shot-gun[1].' But modern business is not usually so simple. The Arkansas landlord, possessing not only a monopoly but a shot-gun, occupied a position of greater freedom in making rates than is normally possessed by a railway manager. Let us briefly see how far the principle which, in railway language, is called 'charging what the traffic will bear' is applied, not only to commercial business proper, but elsewhere in the ordinary affairs of life.

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[1] *Railway Practice.* By General E. Porter Alexander. Putnam & Sons. New York, 1887. An excellent little book.

CHAPTER IX

CHARGING WHAT THE TRAFFIC WILL BEAR

SOME ANALOGIES

THE simplest case of sale at 'cost *plus* a profit' is perhaps to be found in the wages of unskilled labour. The labourer sells his services at cost; that is, food, lodging and clothing according to the standard of his class, *plus* a profit; that is, so much more as the competition of his fellows enables him to obtain. In California or the Klondike the profit is large; in Bengal or China it is small. But in each case the labourer keeps for himself all he gets. He has no interest on capital to pay, no establishment charges, no maintenance of plant, no expenses of sale. The small master tradesman of a century ago was in much the same position. His house was his workshop, and he had no machinery, almost no stock in trade, and consequently almost no capital. If he received an order for a suit of clothes or a pair of iron gates, he bought as much cloth or iron as he required for the job direct from the actual producer, worked it up into its finished form by the expenditure of a definite number of hours of labour, and then charged the customer the cost of materials and labour *plus* his own profit, fixed, no doubt, on a conventional scale. But who can say how much is cost and how much profit in the price of a suit of clothes sold nowadays by the ready-made tailor?

The material, assembled from all over the world, has passed through many hands—each transaction representing, it may be, a profit or a loss—before it has reached the mill. The cloth as it leaves the mill is weighted not only with the cost of labour and supervision and material, which can be pretty definitely ascertained, but with a share of the cost of the buildings, machinery, looms, &c., which is less definite; and with a quite indefinite share of the cost of buyers, travellers, salesmen, clerks, interest on floating capital, &c. Is it not evidently impossible for the mill-owner to give as an objective fact the precise cost per yard of a particular piece of cloth? Is it not further evident that, if he assumes 5*s.* per yard to be roughly the price that will return him his cost *plus* a reasonable profit, this is no reason why he should sell at 5*s.*? For he will certainly not sell at 5*s.* if he can get 6*s.*; he will also certainly sell at 4*s.* if he can not get 5*s.* And at 4*s.* he will be better off than if he does not sell at all; for 4*s.* will cover his out-of-pocket cost for labour and materials and leave something towards his general expenses. Even 2*s.* would be better for him than nothing; for the cloth, if left on his hands, would be useless to him, and 2*s.* would at least go some way towards paying the actual out-of-pocket cost of production. Further, for a considerable time at least, it would pay the mill-owner better to sell all his output at what we may call the 4*s.* rate than to cease production entirely. For—even apart from the question of losing his connexion—it is better to get some, though an inadequate profit out of his capital, plant, and establishment than to get none.

So far we have sketched in outline the history of the cloth, and seen that it has no precise cost of production. Let us now ignore all the various hands that it goes through, though in fact each of them must in the long run affect the price—the fuller, the dyer, the warehouseman, &c.—and imagine that the cloth has reached the tailor. Again the same thing happens. The tailor buys his raw material, the cloth, spends a certain amount in wages for cutting out and making, and then sells a suit to his customer at a price which covers, in addition to out-of-pocket cost for the particular suit, just as much of the general expenses of his factory and shop as he thinks that particular traffic can be made to bear. In a word, the charge to the customer is based on the value to the buyer of the article he buys, not on the cost to the producer of the article he sells.

If, for a tailor in Whitechapel dealing in articles of necessity, we substitute tradesmen dealing in articles of luxury, the range of prices will be very much greater. The frock that in May is offered at twenty guineas by a Bond Street milliner, will perhaps be marked in the window at one-third of the price by the end of July. Is the milliner, therefore, selling his surplus stock 'at the expense of' his regular customers? Is it not, on the contrary, obvious that at the end of the season the traffic in summer frocks will only bear a low rate; that, if they were not sold at a reduced price, they would not be sold at all; and that then the average charge to the regular customers would have to be proportionately raised? Once more, the principle of charging what the traffic will bear is a principle not of extortion, but of equalization of burden. The rich customers get their frocks cheaper because the poorer ones pay the actual cost of production of the surplus which they have left; the after-season buyers obtain almost at actual cost articles which they never could have had if the risks and general expenses of the shop were not covered by the purchases of the regular customers.

Instances illustrating the same principle might be multiplied indefinitely. A house in Mayfair may be let furnished for 20 guineas a week before Christmas, which is less than one fifty-second part of the annual outgoings. The same house fetches 100 guineas in the season. Is the winter-tenant, who is brought in by the low rent, being housed at the expense of the season-occupant? Or are they not both bearing according to their respective ability the total cost? Is the householder making an extortionate profit out of the tenant who can afford to pay? Or is he rather taking the rough with the smooth and, on the whole, getting the average value of his house for the twelvemonth? Take yet an instance from a business apparently more closely resembling a railway. A jobmaster takes a guest to a shooting lodge twenty miles from the station, and charges £2. On the way back the driver overtakes a pedestrian and carries him to the station for 5*s.* Is it any injury to the original hirer that the jobmaster gains the extra crown? Clearly the pedestrian was only brought in by the exceptionally low rate. There could be no question of making him pay half of the cost of the carriage both ways.

But enough has been said to illustrate the principle. In commercial affairs generally, and not in railway service only, prices are based, not on cost to the producer, but on value to the consumer; subject to this, that the lowest price cannot in the long run go below the special cost of the article sold or service rendered, and that all the prices in the long run must cover all the costs, general as well as special, of all the articles or services. Or, to put the same idea in the language of the economic textbooks, the minimum price of an article of manufacture is, in the long run, its prime cost *plus* so much of its supplementary cost as can be charged against it. The total price of the entire output of the factory must equal total cost of the business, *plus* interest on the capital engaged at the normal current rate.

At this stage, however, it may be said: 'A railway is not a shop or a factory, nor a railway manager an ordinary trader. A railway is by its nature a public or quasi-public undertaking; it is to some extent at least a monopoly. The methods which are justifiable in the case of a manufacturer or a shop-keeper are not necessarily justifiable in the case of a railway.' The objection is a fair one, and must be dealt with. In the first place, the public importance and the monopolistic nature of railway charges have been recognized in every country, and have led in many countries to these charges being made directly by public functionaries, and in all other countries to their being subjected to a considerable measure of public control. How, and in what manner, and to what extent, the State should manage or control railways and railway rate-making is a matter we shall have to consider at length, when we have reached conclusions as to the nature of railways and railway business. Meanwhile, we may be content to assume that the application of the principle will not go in practice unchecked. At present we are only concerned with the question whether the principle itself is the right one. We may perhaps take it as shown by our commercial instances that differential charges for the same articles sold or service rendered under different circumstances are not necessarily unfair to or contrary to the interest of the payers of the higher charge. We will next inquire how far the principle of making differential charges for services rendered at identical cost to the renderer is confined to commercial transactions. But before doing this, one more analogy is worth notice.

The business of electric supply is usually a monopoly, and in this country it is more often than not in public hands, yet electric undertakings usually make charges more widely differential than an ordinary railway. A typical charge is *5d.* per unit for electricity used for lighting purposes; *1d.* per unit for electricity used for power purposes. From the commercial standpoint the *5d.* for lighting is fixed as the maximum which the competition of gas and other illuminants will permit; the *1d.* is a charge made to induce users of steam-power, gas-engines and the like, to adopt electricity as a substitute. As a matter of equity the case is this. The electric undertaking was established primarily to supply light. It involves large capital cost for short-lived machinery and mains. Plant and staff must be capable of dealing with maximum demand, and this demand—'the peak of the load,' as it is commonly called—only comes for about two hours of the day, and that during the winter months of the year. For twenty hours out of the twenty-four the bulk of the plant is idle; but interest, depreciation, and standing charges are running on all the time. Such a service cannot but be expensive to give. There is, however, a way to make it less expensive. If consumers can be induced by the low charge of 1*d.* per unit to take electricity for power, they will use it in the day-time, to some extent even in the dead of night, when the machinery would otherwise be idle. The 1*d.*—*ex hypothesi* the highest rate the traffic will bear—will more than cover the extra cost of fuel, and will help to dilute the general expenses of the undertaking. So far from the low differential rate being an injury to, or made at the expense of the consumers of light, the contrary is the case. The standing charges—the great bulk of the whole—instead of being charged on, say, 1000000 units, are now spread over 6000000, and the cost of supply per unit is proportionately decreased. The increase of the low-charged power customers is the only means by which the lighting customers can hope to see the charges made to them reduced[1].

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[1] The analogy to the case of a railway is perfect, and at the same time the case, owing to the fact that the electric undertaking supplies one article only, is so much more simple, that it is worth pushing it somewhat further into detail. Suppose that the first 1000000 units cost (owing to the very short period of the maximum load) 2*d.* per unit to produce. Suppose that another 5000000 units can be produced at an additional cost of ·75*d.* per unit. The total cost for 6000000 units is then $\frac{5\cdot75}{6}$*d.*, or less than 1*d.* per unit. The production cost is halved, and, as the result, the low-priced supply, which was brought in on the basis of merely paying its additional cost, is actually found to be paying the whole of the average production cost and leaving a fraction over to pay interest on capital. Meanwhile an extra 1*d.* out of the 5*d.* paid for each unit by the light consumers has been liberated from meeting production

If we turn from commercial undertakings to professional services, we shall find that the principle of charging what the traffic can bear is universally accepted. Brokers, auctioneers, and the whole army of commission agents work on no other system. You can sell £100 Consols for a commission of 2*s.* 6*d.*; if you sell £10 000 you will pay 100 half-crowns. And yet the trouble and expense to the broker is almost precisely the same in the two cases. But the larger transaction can bear the heavier rate, and the broker could not live if all his clients dealt in £100 amounts. It may be that the commission does not increase proportionately with the magnitude of the amount involved, but it always increases, even if at a slower rate. In the case of solicitors, again, the Legislature has of late years recognized the absurdity of remunerating them, when concerned in the transfer of property, according to the length of the deed, which presumably was a rough attempt to pay on a 'cost of service' basis, and has

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cost and made available to pay interest on capital and depreciation. Clearly the high-price and the low-price consumers are mutually beneficial to one another. Without the high-price consumer the business would never be established. Without the wholesale production made possible by attracting a great volume of low-class business, prices could never be lowered.

Imagine that a further 6 000 000 units would only imply a production cost of ·60*d.* per unit. The total cost for 12 000 000 units then would be $\frac{5\cdot75+3\cdot60}{12}d.=\frac{10\cdot35}{12}d.$ per unit. The company or municipality could now afford to sell power at ¾*d.* per unit, with a substantial margin over to reduce the charges for lighting. But the manager must needs have the commercial enterprise and intelligence requisite to gauge the possibilities of development before he makes his reductions. In a summer sea-side resort power consumers will hardly be brought into existence even if electricity is given away gratis.

enacted that the value of the property conveyed, not the difficulty of the conveyance, shall be the measure of charge. Or take the case of a doctor. The master pays half a guinea and the butler half a crown for the same advice. If the charge were averaged, the butler could not pay and the doctor could not live. We may even ascend to a sphere in which commercial considerations are assumed to have slight weight. Fees are charged, under episcopal sanction, to parties about to marry, on one scale if married by banns, and on a higher scale if married by licence; and at funerals, according as the deceased is buried in an ordinary grave, or in a brick grave, or in a family vault. The underlying principle is clear. Somehow, from all his work, the clergyman, the doctor, the solicitor or the broker must attain an adequate remuneration. That remuneration, if averaged over all the persons he serves, would represent a sum that his poorer clients could not afford to pay. If, then, he refused to serve them, they would suffer, and so would the richer clients, for they would have, by themselves alone, to make up to the solicitor or doctor the total remuneration of which the poorer classes now bear a considerable though not proportionate share.

Yet again. We may pass from the conduct of individuals to the action of the community in its corporate capacity. Our forefathers, thinking truly that the defence of the country was equally the concern of every citizen, levied a poll-tax equal in amount on every inhabitant. Even nowadays French towns raise the money required for their municipal expenditure largely by *octroi* duties on necessaries of life consumed equally by all. But the modern canon of scientific taxation is not equality of payment by each taxpayer, but rather equality of burden or sacrifice. A house in Mayfair, whose occupier is never likely to receive direct benefits from some of the most costly local services, such as poor relief and education, will pay £100 a year towards the local rates, while the occupier of an equally large house in Brixton will pay perhaps a fifth of that sum. The services rendered to the householder in Mayfair are no more than those rendered in Brixton; but the former occupies a house five times as valuable, and it is therefore assumed that he can afford to pay five times as much. So with imperial taxation. Not only is the larger part of the revenue raised from only a small portion of the community, but certain taxes are definitely graduated to favour the poor and lay extra burdens on the rich. Only one, the latest and most conspicuous instance, need be mentioned—the estate duty, which ranges from nothing in the case of very small estates to no less than 8 per cent. of the amount in the case of property reaching upwards of £1 000 000. Broadly speaking, whatever complaint may be made of the method of application, no one questions the justice of the principle. The revenue must be raised somehow. The mass of the community can only pay small sums, the millionaire's estate can bear the differential rate.

We have now discussed the meaning of the phrase 'charging what the traffic will bear.' We have seen that the underlying principle is one not of extortion, but of remission and alleviation. We have seen further that, so far from being in any way peculiar to railways, it is a principle which not only pervades all business and all commercial and professional life, but is applied by the people at large, both locally and in their national capacity, as the true basis for a system of taxation, broadly equitable between the different classes of the community. We have next to discuss the method in which this principle is applied in railway practice.

CHAPTER X

THE METHOD OF CHARGING

CLASSIFICATION

PREVIOUS chapters have afforded a general survey of the essential features of the business of a railway. From the point of view of expenditure, we see that these features are a large preliminary expenditure of capital, which once spent is fixed and irrecoverable, and a large current expenditure of income on the maintenance and operation of the line as a whole, independent in great degree of the volume, independent almost wholly of the particular categories and items of traffic carried over it. From the point of view of income, we come to the conclusion that, as the expenditure belongs almost entirely to the line as a whole, it is impracticable to fix rates with any approach to accuracy on the basis of what the traffic costs to carry. And further, if it were possible, it would not be expedient or in the public interest. For to charge against each category and item of traffic not only its own special costs, but also its full share of general expenses and interest on capital, would mean to shut out from carriage much traffic that in the interest of the community ought to be carried; it would mean, further, a great restriction of the total volume of potential traffic, and so a higher average rate on the traffic actually carried.

Railways, therefore, in every country have followed the same general line of development. Beginning with a small traffic at high rates, they have gradually by lower and lower rates attracted a larger and larger volume of traffic, partly articles of lower and lower value, partly articles of medium value, carried for longer and longer distances. Into the fixation of the rates for such articles 'cost of service' has only entered to the extent that the rates could not, broadly and in the long run, be put lower than the point at which the amount received for carriage covered the extra cost of the special service involved. Subject to this inferior limit and to a superior limit—rarely reached in modern practice, except in the case of goods of small value in proportion to bulk—that no rate, once it covers actual cost, shall be so high as to stop the traffic from going, the rates *inter se* are, as we have seen, fixed on the basis of what the traffic can bear. In other words, the traffic as a whole pays the expenses (including interest on capital) as a whole. And of that whole each item and category of traffic pays such proportion as it is fairly able to pay. The apportionment is only a rough and approximate one, for it is made by fallible men on imperfect data. But it aims at least to distribute the burden according to the strength of the shoulders that bear it.

Finally, we have seen that this principle of charging is in no sense special or peculiar to railways; that all highly-organized industrial and commercial undertakings obtain their income on the same basis; that the principle applies generally to professional incomes; and that local and national taxation is not only imposed in accordance with it, but is commonly and rightly regarded as being properly so imposed. But we have noticed one point where the analogy of taxation fails. From the tax-collector there is no escape. If the Chancellor of the Exchequer decides that cigars can bear an extra tax of 1*s.* per lb., the merchant has no resource but to pay. But if the railway manager decides that cigars can bear an extra railway rate of 10*s.* per ton, the merchant will not pay it if he has access to another and cheaper means of conveyance. 'Can bear' therefore, we must remember, must be not only 'is able' but 'will consent to bear'; and a good deal of the difficulty of railway-rate questions arises from this double meaning of the phrase. Let us now consider the methods and machinery by which the principle of charging what the traffic will bear is actually put into operation.

Theoretically, each category, each item of traffic, has its own capacity to bear a railway rate. A millionaire would pay more than an ordinary first-class passenger before he would desist from travelling; wine may be worth a shilling or a pound per bottle; and so on. But in practice millionaires and rare vintages are negligible quantities; it is impossible to strike a separate bargain with each passenger or each consignor, and simplicity and ready intelligibility are much more important than theoretic equity. Accordingly, even before railways were invented, the canals had developed a rudimentary classification with corresponding scales of rates. Once more the analogy with taxation is worth notice. Of two men, each with £500 a year, the one may be a bachelor with £15 000 invested in 'gilt-edged' stock, the other a married man with a large family and an income entirely dependent on his life and health. No one can think that the income-tax implies equality of sacrifice in these two cases. But the Chancellor of the Exchequer can only strike rough averages; and accordingly bachelors with assured and permanent incomes and fathers of families with temporary and precarious salaries have to pay alike. The canal proprietor or railway manager is in the same position as the Chancellor of the Exchequer. He aims at justice and equality; in a rough and ready way he attains it; circumstances are too diverse and too complicated for it to be possible that he should attain an ideal equity.

Canals, we have said, even before the days of railways, developed a rudimentary classification with corresponding scales of rates. But here a point of importance deserves special notice. New means of communication, whether turnpikes, canals, railways or tramways, cannot in ordinary circumstances be opened without special authority from Parliament. For power to take or interfere with land by compulsion, and to cross, divert, or obstruct public highways and rivers, is almost always an essential pre-requisite of construction. And in this country the Legislature has never given the promoters the necessary powers without laying upon them a corresponding obligation, and limiting the charges to be made to the public for the use of the means of communication provided. We have therefore, preserved in the Statute Book, the list of 'tonnage rates'—in modern language, the classification and scale of maximum tolls—originally authorized to be charged on every canal in the country. How far the maximum tolls were in fact generally enforced we cannot know nowadays. Records have mostly perished. But we cannot doubt that the statutory tolls represented in their day the resultant of the opinion of promoters on the one side and public authorities on the other as to the basis of charge that was reasonable and proper. And when we see the simplicity of the early scales, and their progressive elaboration as time goes on, we can still less doubt that we see before us the gradual growth of knowledge as to the true economic basis of rates.

Now let us turn to the specific instances, not forgetting that they represent, not possibly what the canal company ever did charge, but what Parliament at least considered it would be just that they should charge. Notice, too, that canal tolls are only a charge for the use of the waterway. Cost of carriage, for which each individual consignor either made his own arrangements or entered into a contract with a carrier whom he selected, is a separate thing altogether with which the statutory schedules have no concern.

The Glamorganshire Canal dates from 1790. Its schedule of tolls is simplicity itself.

TONNAGE RATES.	per ton per mile.
Ironstone, iron ore, coal, limestone, lime, and all kinds of manure	2*d.*
Stone, iron, timber, goods, wares, merchandise or other things	5*d.*

The schedule of the Peak Forest Canal, sanctioned only four years later, is somewhat further developed and more typical.

TONNAGE RATES.	per ton per mile.
For all limestone	1½*d.*
For all stone (except limestone), lime, coal, and other minerals	2*d.*

For all dung, clay, sand, and gravel not passing through a lock	1*d*.
For all dung, clay, sand, and gravel passing through a lock	2*d*.
For all timber, goods, wares and other merchandise, and all other articles, matters, and things not herein-before particularized	3*d*.

Here is a third schedule, dating from 1815, that of the Sheffield Canal. It may be taken as showing the most advanced form of the old canal schedules.

TONNAGE RATES.

	per ton per mile.
For all coal, coke, charcoal, limestone, ironstone, slag, sand, arsura, sweep-washing waste, stones, slates, pavors, cord-wood, cinders, manure, bones for manure, turnips, carrots, and potatoes	2*d*.
For all pig-lead, pig-iron, ballast-iron, nut or bushel-iron, old cast-iron, bricks, old ropes and rags, timber unbroken, bones and hoofs	3*d*.
For all bar, rod, or rolled iron or steel, cast-iron goods, deals and other broken timber, lime, onions, apples, pears, peas, beans, rape, line, cole, mustard seed, and all kinds of green groceries that are not by this Act specially charged by name	4*d*.
For all dry groceries, and all kinds of manufactured goods, wares, and merchandise, in casks, hogsheads, or other packages	5*d*.
For all corn, grain or malt, 1*d*. per quarter [=roughly	5*d*.]
For all other goods, matters, and things not specially charged	6*d*.

Now it will be observed that the whole reason for the existence of this classification is ability to pay. The canal company did not handle the traffic, did not carry it, did not insure it. A ton of potatoes cost them neither more nor less than a ton of apples. Yet the potatoes were to be charged only half as much as apples. Old rope, it was thought, could only bear a toll of 2*d.* New rope could bear 6*d.*, and 6*d.* it accordingly had to pay. For an all-round toll of 2*d.* per ton-mile would not, in days of undeveloped traffic, adequately remunerate the proprietors; goods of small value could only bear 2*d.*, therefore goods of higher value must pay up to three times as much, so that the average toll may be sufficient.

The earliest railways were like the canals in that the traffic for which they were intended—goods only, not passengers at the outset—was to be conveyed, not by the company, but by private persons in their own vehicles, hauled by their own horses. An early railway schedule of tolls differs therefore in no respect from a contemporary canal schedule. Here are the toll-rates as authorized in 1801 for the first public railway which ever obtained an Act of Parliament, the Surrey Iron Railway, intended to connect Croydon with the Thames at Wandsworth.

TONNAGE RATES.	per ton per mile.
For all dung carried on the railway . . .	2*d.*
For all limestone, chalk, lime, and all other manure (except dung), clay, breeze, ashes, sand, and bricks	3*d.*
For all tin, lead, iron, copper, stone, flints, coal, charcoal, coke, culm, fuller's earth, corn and seeds, flour, malt, and potatoes . . .	4*d.*
For all other goods, wares, and merchandise .	6*d.*

The Rhymney Railway in the South Wales' coal-field was authorized in 1825. A heavy traffic was unquestionably available, and promoters and the Legislature had, by this time, some conception of the capacity of a railway. Accordingly, we find the maximum tolls of the Surrey Iron Railway cut in half. Otherwise the schedule and the ratio between the highest and lowest classes are much the same.

TONNAGE RATES.

	per ton per mile.
For all limestone, lime, materials for roads, dung, compost and all sorts of manure	1*d.*
For all coal, coke, culm, cinders, stone, marl, sand, clay, iron, ironstone, iron ore and other minerals, building stone, pitching and paving stone, bricks, tiles, slates, and all gross and unmanufactured articles and building materials	1½*d.*
For all manufactured or unmanufactured iron	2*d.*
For all lead, timber, staves and deals, and all other goods, wares, and merchandise	3*d.*

The year 1825 marks roughly the close of the first period of railway development, for the Stockton and Darlington Company had obtained power to use locomotive engines two years before. Moreover, 1825 saw the first promotion of the Liverpool and Manchester Railway, and the following year the original Act of the company was passed. And the Liverpool and Manchester Company expected from the beginning that passengers would use their line, and were authorized themselves to become carriers both of passengers and goods thereon, which in fact they were from the opening of the railway in 1830. It is interesting to note, as showing how entirely separate the businesses of road-owner and carrier were considered to be in those early days, that an Act of the Liverpool and Manchester Company in 1828 provided that, for the purpose 'of forming an establishment for the carriage of goods,' a separate fund of £127 500 should be raised; that the accounts of this department should be kept separate, and separate dividends be made in respect thereof. The Manchester and Liverpool was to carry on, not one business, but three. It was to take tolls for the use of the road (1) by goods, and (2) by passengers. Further, it was to act as a common carrier of both on its own road. So it needed to have not one but three schedules of authorized charges. The first is the familiar:—

TONNAGE RATES.	per ton per mile.
For all limestone	1*d.*
For all coal, lime, dung, compost, manure, and material for roads	1½*d.*
For all coke, culm, charcoal, cinders, stone, sand, clay, building, paving and pitching stones, flags, bricks, tiles and slates	2*d.*
For all sugar, corn, grain, flour, dye-woods, timber, staves, deals, lead, iron and other metals	2½*d.*
For all cotton and other wool, hides, drugs, manufactured goods, and all other wares, merchandise, matters and things	3*d.*

Then follows new matter to meet the new conditions. Chaises, gigs, coaches and passengers and cattle may pass on the railroads on paying:—

	s.	d.
For every person travelling thereon not more than ten miles, in any vehicle	1	6
For ditto, exceeding ten miles but not above twenty	2	6
For ditto, above twenty miles	4	0
For every horse, mule, ass or other beast of draught or burden, and for every ox, cow, bull or neat cattle carried in or on such carriage, not exceeding fifteen miles	2	6

	s.	d.
For ditto, exceeding fifteen miles . . .	4	0
For every calf, sheep, lamb, or pig, any distance .	0	9

This second table is, it will be observed, also a schedule of tolls. It includes neither motive power nor the provision of vehicles. The vehicles, like the canal boats, went free. The toll was charged on their contents.

Lastly, we have the following table of authorized charges for carriage, the earliest form of what is now technically known as a 'schedule of maximum authorized rates.'

The proprietors may carry goods, &c., of all descriptions upon the said railroad, and charge for the same, *including the beforementioned rates* (tolls), the following:—

CARRIAGE RATES.

	per ton. s.	 d.
For all lime, limestone, dung, compost, manure, and materials for roads, stone, sand, clay, building, pitching and paving-stones, tiles, slates, timber, staves and deals	8	0
For all sugar, corn, grain, flour, dye-woods, lead, iron and other metals	9	0
For all cotton and other wools, hides, drugs, groceries and manufactured goods . . .	11	0
For all wines, spirits, vitriol, glass and other hazardous goods	14	0
	per mile.	
For all coal, coke, culm, charcoal and cinders .	0	2½

All shorter distances in proportion.

For all persons, cattle, and other animals, such rates as the company may decide upon.

Two things are here noticeable. Maximum rates are fixed for goods, not for persons, cattle, and other animals. Evidently it was supposed that coach proprietors and drovers would be able to compete with their own vehicles and so keep down prices. Further, though the goods *tolls* rise from the lowest to the highest class of commodities in the ratio of 1 to 3, the goods *rates* only rise in the ratio of about 1 to 2[1]. For, taking the railway as thirty miles long, 2½*d.* per ton per mile for coal would give a total rate of 2½*d.* × 30 = 6*s.* 3*d.* for coal, against 14*s.* in the highest class. Clearly, the theory was that, as the cost of carriage was much the same for all classes of traffic, it should be charged alike to all; the toll it was that should depend on the differential ability of the traffic to bear the rate.

There would be no profit in tracing further in detail the history of statutory maximum schedules during the sixty years subsequent to the opening of the Liverpool and Manchester Railway. Indeed, the 'tonnage rates' or merchandise tolls have no subsequent history. They are still repeated as a matter of form in every Act incorporating a new railway company, very much in the shape which they assumed nearly a century ago. But nowadays the railway company is the sole carrier on its own line—or if another company carries under 'running powers,' given by statute or by agreement, it carries not as a toll-payer, but on special terms prescribed *ad hoc* by the instrument authorizing it to carry—and toll-clauses are for practical purposes as obsolete as the royal veto.

Carriage or conveyance rates were modified somewhat in the twenty years succeeding 1825. Gross sums were replaced by charges per mile. Sometimes an intermediate scale, higher than the toll but lower than the inclusive conveyance rate, was inserted to meet the case, which never can have been anything but quite exceptional in practice, where the company furnished the motive power, possibly also the vehicle, but did not act as carrier. Maximum charges for the carriage of passengers, cattle, and other animals were also fixed, as soon as it became clear that of this business railway companies must have a monopoly. But from about 1845, when the statutory schedules became practically stereotyped, till 1891, when Parliament again effectively interfered in the matter of classification and maximum rates, railway history is concerned not with legislation, but rather with the almost independent action of the companies themselves.

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[1] A toll is a charge for the use of the road. A rate is an inclusive charge for the use of the road and the service of carriage over it.

The goods classification, as Parliament left it, enumerated, as we have seen, some forty articles, usually divided into four classes. All the hundreds and thousands of articles known to commerce, if unenumerated, were normally chargeable as 'other articles, matters or things' in the highest class. Further, the statutory classification was based on the fundamental conception of a company that was a toll-owner only, not a carrier; and the companies had all become carriers. Now to a toll-owner the method of packing, damageability, relation of bulk to weight, and average size of consignment matter not one whit. To the carrier they matter a very great deal. Yet again. The statutory classification was local to each company, and often differed fundamentally between two neighbouring systems or even two adjacent parts of what had in the course of time become the same system. A still more serious point, the statutory maxima were fixed at so much per mile. Terminal accommodation and terminal services before and after conveyance were entirely independent of the length of haul, which was the sole consideration governing the quantum of the statutory charge. Was the statutory charge intended to cover this accommodation and these services, or was it not? Naturally, the traders took the one view, the railway companies the other; and a controversy between them smouldered for a generation, breaking out at intervals into open fire, till at length, about 1890, it was decided, first in the law courts, and then by Parliament, substantially in favour of the railways.

But long before this the railway companies had acted on their own responsibility, and, working through the instrumentality of the Railway Clearing-House, which was established in 1850, had elaborated for themselves an adequate classification, which, for through traffic at least, applied all over the country. The three, four, or five classes of the statutory classifications were expanded to seven. At the bottom of the scale was a Mineral Class, divided into two sub-classes, known as M(A) and M(B). This class applied only to minimum consignments of 4 tons, loaded and unloaded by the owners, and the rate covered only carriage from station to station. In M(A) was included primarily coal, but also coke, iron ore and furnace slag. M(B) was a much longer list, and contained other primary articles of equally small, sometimes even of less value, which, however, are not consigned in great quantities like coal and ironstone. Clay, sand, manure, limestone, chalk, salt or stone in the rough, are typical of this sub-class, though it also contained ores of poor quality, such as those of zinc and copper, and some articles of simple manufacture, such as bricks, paving stones, pig-iron. Then came Class S (Special), applicable to consignments of not less than 2 tons, carried from station to station only, and comprising among the more important articles, hay and straw (machine-pressed), grain, flour and seeds, artificial manures, chemicals, lead ore, and rough iron goods, such as rails, bars, girders and the like. Generically, the goods in this part of the classification—the lettered classes—were known as S to S (station to station) traffic. As a rule they travelled in open, uncovered trucks, and were loaded and unloaded in the open air.

Above the lettered classes came five classes, numbered in ascending order from 1 to 5[1]. The rates for these classes were known as C and D (collection and delivery) rates, because they included not only carriage on the railway, but also collection beforehand from the consignor and delivery afterwards to the consignee, if within a reasonable distance[2]. They were charged, to use the French phrase, without condition of tonnage, except that for consignments less than 500lb. a surcharge was made beyond the regular tonnage rate. The goods in the numbered classes usually required to be protected from the weather in transit and to be loaded and unloaded under cover; consequently they were often known as 'shed goods.' Moreover, the service of loading and unloading was performed by the company, and the cost of it included in the gross rate charged.

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[1] English railways, like English schools, show their insularity by numbering the opposite way from the rest of mankind. The English Sixth Form is the German or French *Prima*. To a non-Englishman a 'first-class rate' means the highest rate charged. The origin of the opposite practice on English railways is evidently that the statutory classifications, though they gave no numbers, always enumerated the lowest classes first.

[2] The system of including cartage charges in the railway rate is peculiar to England. In most other countries the railway organization will perform the services, either directly or through its agents, but a distinct extra charge is always made for it. Comparisons between English and

Here are specimens of the articles included in the five classes:

Class I. Iron and steel hoops, pipes, sheets, plates. Common vegetables and fruits. Paper-making materials and common paper. Raw cotton. Ship or dog biscuits. Bottles (common). Beer in casks. Tallow. Oil in casks. Light scrap iron. Tin ore.

Class II. Mineral waters. Beer in bottles. British wine in casks. Cured bacon (packed). Biscuits. Brass. China in casks or crates. Cocoa-nut matting. Nickel ore.

Class III. Cotton and linen goods. Cured bacon, unpacked. Blankets. Books. Boots in casks, cases, or boxes. China in hampers. Woollen

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foreign railway charges are often unfair because no allowance is made for this important difference. The railway companies south of the Thames used not to conform to this system, and they still do not, so far as their own local traffic is concerned. The system had one curious result. At a small country station the railway company did not and could not maintain a cartage staff; the consignee therefore had to fetch away his own goods. But he was charged a rate based on the supposition that they were delivered to his door, as in fact they were to his neighbour's in the adjoining town, free of charge. Nowadays in such cases, where a railway customer knows his rights and is insistent to obtain them, a 'cartage drawback' is allowed according to an established scale.

cloth packed in trusses, packs, or bales. Tea. Silver ore.

Class IV. Pine-apples. Boots in white rod hampers. Fresh hams or bacon. Brooms and brushes not packed. China in boxes or cases. Woollen cloth in boxes, cases, parcels, or hampers.

Class V. Amber. Aniline dyes. Peaches and apricots. Bonnet boxes. Basket work. Bismuth. Boots in hampers (except white rod). Clocks. Millinery. Artificial flowers. Silk.

It has been already observed that the classification of goods from the point of view of a toll-owner is different from that which is reasonable for a carrier. The toll-owner is concerned only with the value of the goods, that is, with their ability to bear a higher or lower rate. The carrier has to regard the differences between goods mainly as they affect cost of carriage. From this point of view he considers bulk in proportion to weight, method of packing as it affects both convenience of handling and loading and liability to damage, and the average quantity carried in one consignment, more especially if, like guano or gas-lime, the article is one which from its nature must be loaded separately. Now a railway company combines the functions of the toll-owner and the carrier. Naturally therefore the classification partakes of the features of both its parents, and sometimes the one feature and sometimes the other predominates. Take ore, for instance, ranging from iron in the lowest class of all, right up to silver in Class III. Here the dominant, almost the sole, reason of the classification, is value. On the other hand, few things are more valueless than old tin kettles. But, in railway phrase, they give 'uncommonly bad loading,' so cost-of-carriage motives force them into Class I as 'light scrap iron,' and the value principle has to give way. An illustration of the conflict of the two principles may be found from the various entries of china: china in casks or crates, Class II; china in hampers, Class III; china in boxes or cases, Class IV. Evidently china in a box will pack better into the truck than china in hampers. Evidently also it is less liable to injury. But experience showed that the custom was to pack the more valuable kinds in boxes, the cheaper kinds in hampers. So china in boxes is classed highest, both as better able to bear the rate and also as likely to lead to heavier claims for breakage. One more illustration may be given. The value of beer is much the same as that of British wine, and the casks are the same. But British wine is consigned in single casks; beer in truck-loads, if not train-loads. So beer appears in Class I, the wine in Class II. The reader can work out for himself from the specimen articles given above other applications of the conflicting principles.

Such was the classification which the English railway companies, with neither help nor hindrance from public authority, worked out for themselves in the first fifty years of their history. Many of the charges made under it were probably extra-legal, some were doubtless positively illegal. But on the other hand, the classifications and charging powers embodied in the Companies' Acts were as obsolete as the Cambridge Statutes requiring undergraduates to wear sub-fusc garments and to refrain from playing marbles on the Senate-House steps, and the trade of the country could not possibly have been conducted under them.

In the hands of the companies and the Clearing-House the classification grew rapidly. In 1852 there were 748 articles enumerated, or, to speak more accurately, enumerations of articles; for the same article, as we have seen, often appears several times over. In 1860 the number of entries was 816, in 1870 it was 1621; in 1880 it had risen to 2373, and in 1886 to 2753. Of these 2753 entries, 103 referred to articles outside the ordinary classes, the remaining 2650 were thus apportioned:—

Mineral (A) and (B)	80
Special	446
Class I	453
II	500
III	672
IV	319
V	180[1]

And the vast proportion of these articles, having been left unenumerated by Parliament, were legally 'other articles, matters or things' for which the companies were entitled to charge their maximum rates.

[1] *Railway Rates, English and Foreign.* By J. Grierson. London, Stanford, 1886.

CHAPTER XI

THE METHOD OF CHARGING

RATES

IN the last chapter we traced in some detail the growth of the English railway classification. But a classification by itself is nothing; it is only the foundation on which the edifice is to be built up—the framework to which the tariffs or schedules of rates are to be attached. Each class of the classification pre-supposes and requires as its necessary complement a table of rates chargeable for the carriage of the articles comprised in the class.

And here an author, writing from the English point of view, is at a serious disadvantage. Other countries have normal mileage tariffs. Such tariffs may be subject, indeed are subject, to exceptions so numerous that the normal tariffs sometimes disappear from sight altogether. But normal tariffs at least exist; they are printed in a convenient form; they can be studied; and the scheme of charge on which they are based can be ascertained and critically discussed. In Great Britain, alone perhaps of civilized countries, there is no recognized normal tariff of goods rates for any individual company, still less for the railways of the country as a whole. The explanation of this anomaly—so far as it is not due to the instinctive hatred of the practical Englishman for logic and symmetry—must be sought in history.

The original statutory maximum schedules were, as we have seen, quite symmetrical—one penny, twopence, threepence for each mile travelled. But these schedules only applied to quite short distances—the Great Western Railway, 118 miles from London to Bristol, was probably the longest line ever sanctioned by a single Act; half this length would doubtless be much above the average. The statutory maxima by the North-Western from London to Carlisle were contained in half a dozen different Acts for separate sections of the route—the North London, the London and Birmingham, the Trent Valley, the Grand Junction, the Lancashire Union, the Lancaster and Carlisle, and probably others. Moreover, as we have also seen, the statutory schedules with their rudimentary classifications dropped into practical abeyance at a very early date. Even had they remained operative, they could not have had much real influence on the situation. For distances in England are so short; competition by sea, canal, or rival railway is so ubiquitous, that even after twenty or thirty miles a mere mileage tariff may often become unchargeable. And if normal tariffs were not chargeable, where, would naturally ask the practical man, was the use of compiling them, especially as there was no regulation requiring that rates should be published before they were put in force?

An English manager therefore has not, and never has had, a formal tariff, by consulting which he can say—as his French or German or American colleague could say at once—what is his normal rate for Class I traffic for thirty miles, Class III traffic for seventy-five miles and so on. He possesses no general table of rates; only an immense number of separate and individual tables; one table of the rates chargeable from station A *nominatim* to all the other stations with which it exchanges traffic; a second table of the rates chargeable from station B *nominatim* to all other stations, and so on; as many separate tables as there are separate stations. Not merely, be it observed, is there no normal mileage tariff common to the whole country, or even to the entire system of a particular company; no individual station even has a mileage tariff taking that station as a basis; each station has merely a book stating the distance and the charge made therefor, according to class, to each other station with which through rates are in operation.

Now scales of charge which have grown up in this unsystematic way must naturally contain a good deal of what is mere accident that could not be explained on any logical grounds. But for all that, there must exist an underlying system. A rough outline of the English system of rates as it exists, and postponing for the present the discussion of the charges introduced in 1891, when Parliament interfered to recast and simplify and modify the system, would be somewhat as follows. At any given station there is a rate-book, giving rates from that station for each of the classes of the classification to all the stations on each side to which traffic is booked. And, except for goods in the lowest or lettered classes, these rates, known therefore as 'class rates,' include, as has been already said, the services of 'collection and delivery'; that is, the fetching of the goods from the door of the consignor and the delivering them to the door of the consignee. Now collection and delivery is not only expensive, but it is equally expensive whether goods are carried on the railway for ten miles or five hundred. The same may be said of terminal service and accommodation when the goods reach and leave the railway line. Sorting, weighing, invoicing, loading, unloading, checking, &c., have to be performed and paid for[1]. A further point must be noticed. Rates are charged per ton, but a reference to the typical articles enumerated in the last chapter will show that, in the higher classes of the classification goods are not likely to be often sent except in quite small consignments, and therefore the rates quoted for them must, as a matter of business, be on the assumption that such will be the case. And small consignments mean to a railway three distinct sources of serious additional expense: separate collection and delivery, separate handling, invoicing, accounting, &c., at the terminal stations; and bad loading in the railway wagons.

Naturally, therefore, rates for short distances will show excessively steep gradations from the lowest class to the highest. A rate for six miles may be in Class A, 9*d.*; in Class V, 12*s.* Class A rate assumes a truck, the property of a private owner, handed to the company ready loaded with coal at a colliery junction. The company has only to attach the engine, marshal the truck into a train, haul it to destination, and hand it over to the consignee to deal with. In other words, the rate covers little beyond actual haulage along the railway—including therein, of course, a proper share of the maintenance of the road and of interest on the cost of its construction. But in Class V the 12*s.* rate is charged, let us say, on 5 cwt. of straw hats from Luton to Dunstable. The company in this case has to fetch several large cases from the factory at Luton, load them in a shed into the truck, carry them on the railway, unload them at the other end, cart them to consignee, and insure them against loss or damage throughout. For all this it receives 3*s.* Further, it is to be noted that the truck of coal contained 10 tons; the truck with the hats is hardly likely to carry more than 1 ton. Nominally, the railway rate is 1½*d.* per ton per mile for the coal, 2*s.* per ton per mile for the hats; yet it may well be that the former rate is too high, the latter too low.

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[1] The companies as between themselves—when, therefore, they have no motive for exaggerating—reckon that terminal service, including collection and delivery, costs on the average 8*s*. 6*d*. per ton in London, 4*s*. per ton elsewhere. In other words, if a ton of goods is sent from London by the Great Eastern to Halstead on the Colne Valley Railway, a distance of sixty-six miles, supposing the rate charged to be 15*s*., then the Great Eastern Company will take, out of the 15*s*., 8*s*. 6*d*. for terminal in London; the small company 4*s*. for terminal at Halstead. There remains 2*s*. 6*d*. as the sum attributable to conveyance proper, and this will be divided between the two companies in proportion to mileage, $\frac{52}{66}$ to the Great Eastern, $\frac{14}{66}$ to the Colne Valley Company.

Another point may be observed. Except for small miscellaneous consignments the 12*s.* rate is largely what is called a 'paper rate.' That is, it is not a rate at which traffic will really pass. Any one with wholesale business in hats between Luton and Dunstable would find it much better worth his while to cart his goods all the way than to pay the railway charges. It comes to this. The railway for high-class goods carried short distances cannot afford to make anything but a very high charge per mile. That charge is higher as a rule than the traffic will bear. Therefore the traffic does not come to the railway at all. On the coal, on the other hand, the railway can afford to make a charge much lower than the coal-owner could obtain by any other means of carriage, and therefore the railway gets the traffic.

Now let us suppose a distance of 100 miles instead of six. Here the Class A rate will be probably about 6*s.*; Class V, say 35*s.* The ratio between the two rates has become six to one instead of sixteen to one. The coal rate has increased eightfold, but the distance sixteenfold. The highest-class rate, however, has increased less than threefold. The coal rate has increased much more proportionately than the Class V rate, because it was based almost wholly on mileage, while the other rate was mainly made up of terminal charges at both ends, quite independent of mileage. We may suppose that the terminal services on the high-class traffic absorb 10*s.* per ton. We have then left a conveyance charge of 2*s.*, which is equal to 4*d.* per mile for the shorter distance, and of 25*s.*, equal to 3*d.* per mile for the longer distance. In the case of the coal we may neglect the terminal charges altogether, and say that the rate is 1½*d.* per ton-mile for the longer distance, ¾*d.* for the shorter.

The conveyance rate per mile, it will be observed, falls in both cases as the distance increases, and this is explicable on two grounds. In the first place, it costs a good deal less to carry 1 ton a hundred miles than to carry 16 tons six miles, though in each case the process is expressed as the carriage of 100 ton-miles[1].

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[1] Broadly, for the reason that long hauls get more

Further, traffic becomes less and less able to bear the rate as each successive mile is travelled and charged for. The former consideration—that based on the cost to the railway—applies equally to traffic of all kinds. The latter—based on the capacity of the customer to pay—naturally applies with less and less force as the value of the article carried increases. In the case of coal, where the difference between pit cost and the effective demand price at the consuming point is not many shillings, it applies early and forcibly. In the case of hats worth very many hundred pounds per ton, it hardly begins to apply even where rates are the highest and distances the longest practically attainable on railway lines. So we see that, whereas the unaided cost of carriage principle brings down the hat-rate from 4*d.* to 3*d.*, the combination of the two principles brings down the coal-rate from 1½*d.* to ¾*d.*, a ratio in the former case of four to three, in the latter of two to one.

Now let us put our imaginary pair of stations 150 miles apart. Here the scale of rates would be probably something as follows:—

Class A, 7*s.*	Class II, 25*s.*
,, B, 11*s.*	,, III, 32*s.*
,, C, 15*s.*	,, IV, 40*s.*
,, I, 20*s.*	,, V, 47*s.* 6*d.*

Coal begins to touch the maximum rate that it can bear; consequently it is only charged an extra 2*s.*, or less than ½*d.* per ton-mile, for the additional fifty miles. The hats, on the other hand, are charged at the full rate of 3*d.* for each additional mile. The total rate

mileage out of engines, wagons, train-staff, &c., than a number of short hauls, necessarily with waits between; engines and wagons are better loaded, and the line is more continuously utilized.

per mile is lower for 150 than for 100 miles, because the terminal charges are spread over a longer distance. But the mileage charge is not decreased. And this is but reasonable, for it is only at the commencement of the scale that an increase of conveyance distance causes a rapid decrease of conveyance cost per mile.

Beyond this distance of 150 miles there is no profit in tracing the growth of mileage rates. They are beginning to be rates that traffic in the lower classes cannot bear. They may exist in the rate-book, but they will be little more than 'paper rates.' Even the high-class rates will not show any regular arithmetical progression. Not that hats and the like could not bear a rate of 85*s.* for 300 miles, 110*s.* for 400 miles, and so on. But, as has been pointed out earlier[1], 'can bear' means sometimes 'is capable of bearing,' sometimes 'will consent to bear.' From London to Edinburgh the hat-rate is fixed, not according to abstract considerations of justice and equality of sacrifice, but at a price just so much above the rate by steamer as the hatter will consent to pay for the superior safety, regularity, expedition, frequency, and convenience of the railway service.

But water competition is not the only factor to disturb the symmetrical progression of the mileage scales. Between any two large towns in this country there are usually two or more competing railway routes of different lengths. From London to Portsmouth, for instance, there are two routes, seventy-four and eighty-six miles in length respectively; from London to Exeter two, 171 and 194 miles; from London to Bristol there is the direct route of 118 miles and a circuitous route nearly twice as long in the hands of the Midland, passing from Birmingham through Worcester, Cheltenham, and Gloucester, at all of which points the Midland line is cut by a direct Great Western line from London. That the long line cannot charge more than the short line to the competing point is obvious. So, as the phrase goes, 'the short line rules the rate,' and the Brighton line has to accept South-Western rates, based on its seventy-four miles, to Portsmouth, and these will be the mileage rates entered in the Brighton Company's London rate-book. But what of the stations situated on the Brighton line short of Portsmouth, but more than seventy-four miles from London; on the Great Western more than 171 miles from London, but short of Exeter; on the Midland between Birmingham and Bristol? Three solutions are possible. The rates to the last few stations into, say, Exeter, may be made the same as the rates to Exeter, or they may rise to the highest point at about 183 miles from London and fall again as Exeter is approached. Or lastly, the company may, if the disparity of distance is too great, not attempt to touch the competitive business and keep up its local rates. It depends on a number of circumstances which of these solutions is actually adopted. The instinctive desire of the company will naturally be to keep up the local rates, and at the same time to put the rates to the competitive point on a level with the rates of the short-distance rival. But to charge more for the short haul than for the long has a strong appearance of injustice, and is often made impossible by public opinion, even if not by positive law[1].

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[1] See p. 85.

[1] There are in the United States 'long and short haul clauses,' of various degrees of severity, in the railway law

So far we have been dealing with the normal scales of rates which are professedly based on mileage. When we consider the ubiquity in this country of railway competition, even for quite short distances, and of water competition for longer distances, and when we realize further that competition necessarily upsets the mileage scale, not only at the competing point, but within its whole range of influence, we are able to appreciate that even these normal scales are far from being symmetrical mileage tariffs. But this is not all, nor indeed the principal part of the story of English railway rates. Our mileage rates, speaking broadly, only touch the retail business of the country. The wholesale traffic, the large consignments, the constant interchange between great centres, the export, import and transit trade—all this is done at what are called 'special' or 'exceptional' rates.

Called 'exceptional,' they are rather the rule than the exception. What proportion of the total tonnage pays 'scale' or 'special' rates respectively, either on English railways as a whole or on the railways of any particular company, probably no one knows with accuracy. Certainly no statistics are published. But the general manager of one of the great companies declared twenty years ago that only 15 per cent. of his company's business was done at scale rates. Exceptional rates are always below the scale rates. But they may be anything from 5 to 50 per cent., or even more, below.

both of the Federal Government and of very many separate States of the Union. Our own law (Railway and Canal Traffic Act, 1888, sec. 27 (3)) empowers but does not require the Railway Commission to prohibit higher rates for the shorter distance. But I am not aware that any case has actually been decided under this section of the Act.

Further, they may be made with reference to the mileage scale—so much per cent. off—or they may be fixed regardless of mileage at a positive figure, so much per ton from *A* to *B*. In this latter case the rate is, of course, only available between the specific points named. Special rates made by percentage concessions are usually applicable all over the line, provided the conditions attached to them are complied with.

The simplest form of a rate of this kind is the series of 'owner's risk' rates. A reduction of 10 or 15 or 20 per cent. off the ordinary class rates, according to the character of the goods, is made on a very large number of articles, glass, china, damageable iron castings, machinery, &c., when the consignor contracts to relieve the railway company of their common law liability for loss or damage. It will be observed that the percentage reduction is very much more than the cost of actual insurance could amount to. In fact, it is a method of differentiating between the regular trader, who alone is likely to avail himself of the option, and to whom a 10 or 20 per cent. discount off his annual bill for carriage is a serious matter, and the casual customer who will pay any railway rate charged without hesitation. These 'owner's risks rates' are, however, perhaps more properly described by their official title of 'reduced class rates' than as exceptional rates.

An example of a somewhat different kind is to be found in the exceptional rates for grain. Grain is classified in Class C, provided it is sent in consignments of at least two tons. But a two-ton consignment is quite likely to require, though not to occupy, an entire truck for its conveyance. It is therefore much in the interest of the company to encourage the farmer to send his produce in larger lots. It is also much in the interest of the farmer to save on his carriage bill. Accordingly, rates lower than the normal Class C rates are put in force for 4-ton lots, still lower rates for lots of 6 tons. Whether these rates are entered ostensibly in the rate-books all over the system as percentage reductions for large quantities, or whether, as is more usual, they are entered as special rates *nominatim* from a particular local station to the neighbouring market or milling centres, they are equally in fact general concessions given whenever they are likely to be made use of in consideration of larger quantities being sent. The two governing principles, cost of carriage on the one hand, what the traffic will bear on the other, combine to explain them.

Lastly, we come to special or exceptional rates strictly so called. Let us take as an illustration a specific trade. Tin-plates are manufactured in hundreds of thousands of tons in the valleys of Monmouthshire and South Wales. Thence they go in wholesale quantities to the manufacturers of hollow ware—pans, cans, kettles and the like—or to the merchants in the great centres; they go in still larger quantities to Liverpool and London for shipment all over the world. The distributing merchant in his turn sends out tin-plate to the ironmongers all over his district, a box or two at a time. We shall find that tin-plate gets three different sets of rates corresponding to these three different conditions. It is placed in the classification in Class I, and the local retail traffic will go at the Class I rate, averaging perhaps 2*d.* per ton per mile. From the mill to South Staffordshire the charge may be 12*s.* or 15*s.* a ton, equivalent to a rate of 1½*d.* or

1¼*d.* per mile in 2 or 4-ton lots. Lastly, to Liverpool the rate may come down to 9*s.* or 10*s.*, a good deal below 1*d.* per ton per mile. At any higher rate coasting vessels would carry the traffic round by sea from Newport or Swansea, and, as we have seen in an earlier chapter, to the railway manager 'any rate is better than no rate.'

Take another instance. The Birmingham Corporation has recently constructed in a remote Welsh valley a series of huge reservoirs and built an aqueduct thence to Birmingham. Into a district whose requirements are normally on a very retail scale cement had to be carried in tens of thousands of barrels and iron pipes in thousands of tons. Special rates are put in force for the exceptional traffic and withdrawn when the work is completed. Here is a case of a different kind. An iron-works draws its supply of limestone within a radius of thirty miles. Fifty miles off there is a quarry of good quality and easily worked. The owner goes to the railway company, points out that he can sell his limestone at the works for 7*s.* a ton; he can produce it, allowing for royalty, cost, and profit for 4*s.*; he thinks he could do a trade of 30,000 tons in the year, if he can get a railway rate of 3*s.* a ton. And though the normal Class A rate would be more like 5*s.*, and though the railway manager will do his best to argue that the producing cost will be less than 4*s.*, and that the selling price is more than 7*s.*, if the quarry owner can make good his figures, his chance of getting the exceptional rate he asks for will be a very good one[1]. But the rate will very likely be coupled with a condition that not less than ten trucks shall be sent in a single consignment, or that the traffic shall amount to a minimum of 2000 tons per month.

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[1] I have refrained in the text from all allusion to the effect this special rate may have on other comparable rates

Exceptional rates are often made, not for an individual colliery, works, or station, but for a whole 'group.' There is, for instance, a group-rate from the South-Yorkshire coalfield to London, whatever be the colliery of origin and whatever be the station of destination. The advantage in simplicity is obvious; the London coal-merchant can buy on equal terms from every pit within the group; the coal-owner can bring his coal to bank at whatever point is most convenient within the field. And where the grouped collieries do business towards all points of the compass no one is likely to offer objection. When, however, the output all goes away in one direction the colliery owner nearest the consuming points is apt to think that the railway company is depriving him of what he calls 'the natural advantage of his geographical situation.'

and on rival producers. It seems better not to complicate the general question of rate-making by introducing the very difficult subject of 'undue preference.' It is a subject that can never be absent from a railway manager's mind every time he is asked for a new special rate. But its full discussion will be better reserved for a later stage.

CHAPTER XII

CLASSIFICATION AND RATES

THE INTERFERENCE OF PARLIAMENT

In the two previous chapters we have sketched the development of our English system of rates and classification. We have seen reason to think that the early Parliamentary schedules, for goods traffic at least, were obsolete even before they were enacted. Certainly they became obsolete at a very early date. They were forgotten or tacitly ignored, like many other Acts that only remain on the Statute Book because no one has attempted to put them in force. There might be and were serious complaints of relative inequality in rates, and Parliament established more than one tribunal to deal with the matters. But to the absolute *quantum* of the rate little attention was paid. And, indeed, manufacturers and merchants, who, with the aid of the rapidly extending railway system, were capturing the trade of the world, who remembered what rates had been in the pre-railway days, were not likely to complain very seriously. But the Acts remained in the Statute Book all the time, and when depression succeeded the great outburst of trade activity in the early 'seventies,' traders began to claim their protection. It was freely asserted that the companies were making charges in excess of their legal powers.

The assertion was easy, the proof of it exceedingly difficult. For one thing, it was by no means clear what the charging powers of the companies were. Not only was a through route made up often of half a dozen different sections of line, each authorized under a different Act, with divergent classifications and varying scales of charge, but sometimes it was not clear under what Act the line had been actually constructed. There were even cases of lines where no maxima existed at all. Assuming that it had been ascertained what the maximum legal rate was, it was still a question what that rate was meant to cover. That it at least did not cover the services of collection and delivery outside the railway premises was admitted. But it was claimed on the part of the traders that it covered everything else; on the part of the railways that it covered mere conveyance along the line, and that everything else, the use of the station, checking, weighing, invoicing, loading, marshalling, unloading, &c., was legally subject to a reasonable but undefined additional charge. If the traders' view was correct, millions of rates were undoubtedly illegal. If the railway contention was sound, a rate would need to be very extortionate before it could be challenged on the ground that it exceeded the legal maximum. On this question of the right to charge terminals a long battle was fought in the law courts. The decision mainly turned on the question what meaning a varying body of legislators, who may be assumed to have had no special familiarity with the subject on which they were legislating, intended, in and about the year 1840, to attach to the words 'the services of a carrier.' A wealth of antiquarian research, naturally undertaken with more advantages by the railway companies than by their opponents, was directed to the solution of this question. In the end the victory was in the main with the companies, but before the final and most important decisions were given, the matter had been referred from the law courts to the judgement of Parliament.

The question of railway rates occupied the attention of Parliament almost continuously for thirteen years. In 1881 a Committee was appointed by the House of Commons. This Committee took evidence of great length; but, not having time to report, was re-appointed in 1882, when it took further evidence and reported. It recommended:—

(1) 'That one uniform classification be adopted over the whole railway system.

(2) '"Terminal" charges to be recognized, but subject to publication by the Companies, and in case of challenge to sanction by Railway Commission.

(3) 'That on application by a railway undertaking for Parliamentary powers attention should be directed by some public authority to the proposed, and in the case of an existing company, to the existing rates and fares, with a view to their consideration by the Committee.'

The Committee further expressed their 'opinion that it is essential to the protection of the public that a maximum rate should be fixed in all cases.'

It naturally devolved upon the Board of Trade to bring in a Bill to give effect to the report. Two points were obvious, though the attention of the Committee does not appear to have been directed to them. A new classification could not possibly be applied to the old maximum rates of the various railways. Secondly, a piecemeal revision of existing rates, as and when each company applied to Parliament for new powers, was unworkable. A Private Bill Committee, before which the North-Western came with a proposal for some small new branch, could not possibly attempt to revise the existing rates over the whole North-Western system.

In the sessions subsequent to 1882 various attempts were made by successive Presidents of the Board of Trade to deal with the question. Finally, an Act, which became law under the title of the Railway and Canal Traffic Act, 1888, settled the method in which a revision of the statutory rates for goods—passenger fares and tolls for goods were left untouched—should be carried through.

The Act of 1888 laid down that each company, or in its default the Board of Trade in respect of each company, should prepare for submission to Parliament a revised classification and schedule of maximum rates, and that such classifications and schedules, when approved by Parliament, should take the place of those contained in the whole of the existing Acts. In pursuance of this legislation two special Commissioners appointed by the Board of Trade held an inquiry extending over the years 1889, 1890, and the Board of Trade ultimately submitted to Parliament a series of thirty-five Provisional Orders. These Orders were subjected to a further exhaustive examination by a Joint Committee of the two Houses in the sessions of 1891 and 1892, and, after considerable modification at the hands of the Committee, became law under the title of the A. B. Railway Co. (Rates and Charges) Order Confirmation Act, 1891 or 1892. The leading companies had each an Order to itself; the smaller companies were dealt with in groups.

Each Order comprises two main parts, the classification and the schedule of maximum rates. The classification is absolutely identical throughout the thirty-five Orders. In other words, there is now in force throughout the whole United Kingdom one uniform statutory classification. Provision is made for future inclusion of new articles, but alteration would require a new Act of Parliament. This statutory classification is, however, a maximum only. Any individual company is free to place any or every article enumerated therein in a lower class. In practice, however, this is not done. Changes of classification are only made by agreement between all the companies, and accordingly the 'working,' or 'Clearing-House classification,' which is maintained alongside of and subject to the statutory classification—often falling below it, but never rising above it—is also uniform throughout the country.

Of the statutory classification little need be said. It took for its basis—the only basis which indeed was possible—the classification whose methods and principles had been worked out, as described in a previous chapter, by the companies during fifty years of the higgling of the market. An alteration was made in the names of the 'lettered' classes. The companies' M (A), M (B), and S became more simply the statutory A, B, C, and so the number of separate classes was increased from seven to eight. In certain instances particular trades were successful in persuading the Board of Trade or the Parliamentary Joint Committee that the articles in which they were interested had been in the past compelled by the companies to bear more than their due share of the general burden. And in such a case an article which had hitherto appeared in, say, Class IV of the Clearing-House classification was included in Class III of the statutory classification; but in the main the statutory classification reproduces the Clearing-House classification as it stood in 1890. And it may be added that this latter, as re-issued by the companies from time to time, shows only slight variations from the statutory classification. One divergence, however, between the two should be noted. The working classification often removes goods into a lower class on condition that certain methods of packing or consignment are adopted, such special treatment being justified partly on the ground of economy in carriage, partly as a concession to the wholesale trader. Here are some instances :—

Clearing-House Classification.		Statutory Classification.	
Leather hose, e.o.h.p.[1]	Class IV	Leather hose	Class IV.
Leather hose in bales	Class III		
Mattresses, e.o.h.p.	Class IV	Mattresses	Class IV.
Mattresses, packed	Class III		
Mattresses, wire netting rolled round the woodwork and covered with canvas	Class II		
Rennet, e.o.h.p.	Class III	Rennet	Class III.
Rennet in casks	Class II		

In both classifications Classes A and B apply only to a minimum consignment of 4 tons; Class C to a minimum of 2 tons. The other classes are without any condition as to weight of consignment; but, whereas, under the old rule, articles less than 500lb. in weight, technically known as 'smalls,' were subject to an extra charge, the 'smalls' surtax now does not apply above 3 cwt.

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[1] e.o.h.p. means 'except otherwise herein provided.'

That the new statutory classification was a great benefit to all parties can hardly be doubted. Simplicity and uniformity were substituted for a welter of confusion and contradiction. And this was not all. The old Acts had recognized the equity of causing pig-iron to bear a larger share of the common burden than ironstone; finished iron in its turn more than pig. Now the process was carried further, and 'all other articles, matters and things' were differentiated by careful application of the same principle.

But as to new schedules of maximum rates there is more room for doubt. Professor Hadley, now President of the University of Yale, whose book appeared in America while the controversy in England was at its height—a writer whose competence could as little be impeached as his disinterestedness—had sounded a note of warning. 'Every careful student of the question, from Morrison, in 1836, down to the Committees of 1872 and 1882, has come to the conclusion that fixed maxima are of next to no use in preventing extortion[1].' Parliament, however, had decided that revised schedules of maximum rates should be put into force, and the

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[1] *Railroad Transportation*, p. 178. Morrison was James Morrison, sometime M.P. for Inverness, and a recognized authority on railway questions in the House of Commons in his day. His book, *Tracts on Railways* (London, 1848), will even now repay perusal. The Committee of 1872 was a Joint Committee of both Houses, and a very exceptionally strong one. Their report said: 'Legal maximum rates afford little real protection to the public.' I am not myself able to find in the Report of the Committee of 1882 any passage bearing out President Hadley's statement of their attitude on this question.

Board had only to give effect to what Parliament had decided. But on what basis? On this point the Act was silent. The new schedules were to be, 'in the opinion of the Board of Trade, just and reasonable.' Parliament had, however, given one indication, though only of a negative kind. The Committee of 1882 had spoken of 'due regard to the interest of the existing companies.' And the Bill for the Act of 1888, as it left the House of Lords—into which it was first introduced—had required the Board so to fix the new maxima that they should 'be upon the whole equivalent' to the existing maximum rates. The House of Commons struck out the obligation to consider the existing rights of the company and left the Board free to fix such new maxima as they might, deciding on what grounds they pleased, think just and reasonable.

Seldom perhaps has a more striking example been shown of the capacity of the English constitution to work a peaceful revolution under the form of ordinary law. Railway shareholders had invested hundreds of millions sterling on the faith of being permitted to make certain specified charges. In future they were only to make such charges as a Government Department might think reasonable. And yet the price of railway shares was hardly affected. If any one was really to be pitied, it was not so much the railway shareholders as the officials of the Board of Trade, who were required to evolve from their own inner consciousness a standard of justice and reason.

When a body of promoters or an existing company apply to Parliament for an Act for a new railway, it is clearly justifiable—it may or may not be politic—to fix the maximum rates as low as the promoters will consent to accept. But in dealing with the maxima of an existing undertaking the only equitable plan would seem to be to fix them so that they did not cut across the top of any existing and justifiable charge. And a charge within the old maxima was clearly entitled to be regarded as reasonable till the contrary had been shown. But to investigate *seriatim* all the hundreds of thousands of cases in which rates were charged markedly above the average was an impossible task. It could not be and was not attempted.

The principles on which the revision was carried through are set out in the Report of the Commissioners appointed by the Board of Trade to hold the special inquiry, Lord Balfour of Burleigh and the late Sir Courtenay Boyle. 'The railway companies,' they say, 'have built up a traffic remunerative to themselves at rates, generally speaking, much lower than those at present authorized by Parliament, and consequently we believe that it is equitable to make a reduction in their present powers and to fix rates, based to a great extent on existing rates, but with a reasonable margin of profit for possible changes of circumstances injuriously affecting the cost of or the returns from the carriage of merchandise by railway.' The importance of this passage lies in the words 'based to a great extent on existing rates.' How the Commissioners understood them is plain from the following passage:—

'The railway companies have urged persistently and strongly that the future maxima ought to be so fixed as to result in no loss of revenue to the company. If by this is meant that the future maxima should be such as to cover all existing rates, we are unable to agree to the proposition. To what extent there is justification for the very wide differences which exist in actual rates we are not called upon to pronounce. But it is material to a just settlement of powers of charge that it suits the companies in a large number of instances to conduct traffic at rates much lower than those authorized in their present Acts or in the schedules attached hereto. If maxima were to be fixed at rates high enough to cover present non-competitive charges, the traders who rely solely on a particular railway would be without the Parliamentary protection which they claim, and, as we believe, reasonably claim.'

Two propositions in the last paragraph need to be examined in the light of the considerations as to the nature of the business of a railway set out in previous chapters of this book. 'It suits the companies in many cases,' says the Report in effect, 'to charge rates much lower than the proposed new maxima, therefore such rates must be reasonably profitable.' 'It is reasonable for the State to reduce perforce certain existing rates charged where there is no competition.'

Two comments are to be made. A railway does business at a minimum of profit, where a larger profit is unattainable. It gets a high rate where it can, it takes a low rate where it must; and so on the whole a reasonable revenue is secured. The low rates may only pay working expenses; the high rates may have to meet the interest on the whole capital; if one half of the rates are to be kept down by economic, and the other half by legislative compulsion, there is no point at which a dividend emerges. To call upon a railway company to give to an inland town rates on the same scale as those which it gives where there is sea competition, simply because it there gives them, is to call upon it, not to maintain equality, but to counteract an inequality for which, not the railway company, but the Author of the Universe is responsible.

The other comment is this. Rates are, it is suggested, high, because non-competitive. It would be at least equally true to say that rates are non-competitive because they are high. In other words, no one cares to compete for the traffic of a district where rates are naturally high. For such a district is necessarily a backward one, or even a district with scant natural resources. But the rates are not too high; as a rule they are not so high as they reasonably might be; as they would be, if the company had not other and more profitable fields to work[1]. A poor district implies, as has been pointed out earlier, scant traffic; scant traffic implies that the entire cost of the railway must be charged over few items; in other words, that each item must bear a proportion of that cost many times more than it need bear on a great trunk line.

Thirty years ago, Albert Fink, a man who combined, in perhaps unequalled degree, practical business capacity and grasp of abstract economic theory, dissected in minute detail the published accounts of the railway of which he was then President, the Louisville and Nashville. He analysed the cost of carrying a ton a mile on the main line and on each of the different branches. And, after giving numerous detailed illustrations of his method, he summed up as follows: 'A careful investigation shows that, under the ordinary conditions under which transportation service is generally performed, the cost per ton-mile in some instances may not exceed one-seventh of a cent, and in others will be as high as seventy-three cents per ton-mile on the same road.' In other words, cost of carriage to the carrier is shown by actual experience to vary all the way from 1 to 500. If then the sender of the goods consigned under the most expensive conditions is in practice charged a rate not more than ten times the lowest rate charged, and the actual difference in conveyance rates for long-distance coal and short-distance hats has never been more than this, surely he has no special right to call for 'Parliamentary protection.' What Parliamentary protection in fact comes to is that the State interferes to compel the coal to bear some portion of the cost of carrying the hats; or, which is only another form of the same thing, to compel a trader who is fortunate enough to live on the main line of the Great Western to pay part of the carriage account of another trader who lives in Cornwall or Cardigan[1].

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[1] It is not too much to say that there is hardly a single company in the United Kingdom, dependent solely for its livelihood on the local traffic of country districts, that is a reasonably profitable undertaking to-day.

In what has been written above the position assumed by the Board of Trade Commissioners has been criticized from the point of view of pure theory. As a matter of practical politics, their eminently British spirit of non-logical compromise was exceptionally successful. It is safe to say that public opinion and Parliament would not have supported a scheme of revision which reserved to the companies all the powers to which they could have made out what was, economically speaking, a good claim. The companies' powers were cut down with an unsparing hand. But the net revenue of which the Commissioners' schedules deprived them was only a small percentage of that which was preserved to them intact. And on the whole the Commissioners' schedules—though considerable variations were certainly made, as much perhaps in favour of as against the Companies—commended themselves to the Parliamentary Joint Committee. Whatever variations were made in their detail, the form of them, and the principle on which they were based, went substantially unchallenged.

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[1] In France the companies publish statistics showing receipts and expenditure of each section of their system separately. The main line of the Paris and Lyons Company, from Paris to Marseilles, is 540 miles, about one-eighth of the entire system. Of course its capital cost per mile is far above the average. Equally of course the rates on it per ton-mile, being charged mainly on wholesale traffic carried for long distances, are far below the average. Yet the main line pays some 17 per cent. on its cost. Roughly, half the net earnings of the company are obtained on one-eighth of the mileage. But as many lines of Savoy or Auvergne, spite of low capital cost and high rates per mile, do not cover their expenses, the average net earnings of the total capital of the company are not 17, but about 4 per cent.

The maximum rate schedules as finally passed deal, not only with merchandise proper, but with animals, carriages, exceptional articles (locomotives, wild beasts, bullion, &c.), perishable merchandise by passenger train, and small parcels by goods train. For all these latter categories the maximum rates are made uniform over the whole country. We need, however, only concern ourselves with merchandise proper. It will be understood that the schedules apply only to traffic carried by goods train. A company is under no obligation to carry goods by passenger train. It may do so, if it thinks fit; but if it does it is entitled to fix its own terms.

The goods schedules then comprise an introduction and two parts. The introduction states that certain services, of which the most important are collection and delivery and services at private sidings, are outside the schedules. The charges for these are in the discretion of the company, but they must be reasonable, and in case of dispute are to be fixed by arbitration. Part I gives the maximum station and service terminals, these phrases being so defined as to include all possible charges before and after conveyance other than the specially exempted extras referred to above. Station and service terminals are, with only one local exception, uniform all over the country. They are enacted in the following form :—

MAXIMUM TERMINALS.

In respect of merchandise comprised in the under-mentioned Classes.	Station terminal at each end.	Service Terminals.			
		Loading.	Unloading.	Covering.	Uncovering.
	per ton. *s.* *d.*	per ton. *s.* *d.*	per ton. *s.* *d.*	per ton. *s.* *d.*	per ton. *s.* *d.*
A	3	–	–	–	–
B	6	–	–	–	–
C	1 0	3	3	1	1
I	1 6	5	5	1·50	1·50
II	1 6	8	8	2	2
III	1 6	1 0	1 0	2	2
IV	1 6	1 4	1 4	3	3
V	1 6	1 8	1 8	4	4

Here is a second table giving conveyance rates, but this time applicable only to a single company, the Great

Eastern, whose Order happens to be the first of the series:—

MAXIMUM RATES FOR CONVEYANCE.

In respect of merchandise comprised in the undermentioned Classes.	For the first 20 miles, or any part of such distance.	For the next 30 miles, or any part of such distance.	For the next 50 miles, or any part of such distance.	For the remainder of the distance.
	per ton per mile.	per ton per mile.	per ton per mile.	per ton per mile.
	d.	d.	d.	d.
A	1·15	·90	·45	·40
B	1·40	1·05	·80	·55
C	1·80	1·50	1·20	·70
I	2·20	1·85	1·40	1·0
II	2·65	2·30	1·80	1·50
III	3·10	2·65	2·0	1·80
IV	3·60	3·15	2·50	2·20
V	4·30	3·70	3·25	2·50

Perhaps this Great Eastern schedule is as nearly typical as any one that could be taken. Speaking broadly, the great lines from London to the north have maxima lower than these; the lines south of the Thames and the lines which do not touch London at all have as a rule maxima somewhat higher. The difference—in percentage, not in absolute amount—is more marked in the lower classes. The Great Eastern schedule is, however, unusually simple. It applies all over the Great Eastern system. Most of the great companies have more than one schedule, sometimes even three or four, applying on different sections of their lines. Moreover, in very many cases what is known as 'bonus mileage' is for charging purposes added to the actual physical distance. The Severn tunnel, for instance, is reckoned as twelve miles long; the Forth bridge as twenty-three miles for certain traffic, fourteen miles for other traffic. Further, it is by no means easy in many cases to know what schedule applies to any particular railway. The Great Western rates, for instance, to Abingdon, to Calne, to Bridport, to New Quay, and many other places shown in *Bradshaw* as situated on the Great Western railway, are regulated not by the Great Western schedules alone, but partly by separate schedules dealing with the subsidiary companies whose lines in 1890 were only leased to the Great Western, though most of them have since then been acquired by that company. In some cases the difficulty of reducing the complications of the existing methods of charge within the framework of a schedule which should bind without crippling a railway company proved so great that the task had to be abandoned, and an Order accordingly provides that, with reference to some particular piece of line, 'nothing in this Order shall affect the tolls, rates, dues, and charges prescribed by the A. B. Act[1].'

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[1] Even maximum railway rates have their humorous side. One of the Orders, intituled with the name of the Midland and South-Western Junction Railway, deals with, amongst others, two small Cornish railways, the Liskeard and Looe and the Liskeard and Caradon. The maximum rate schedule is in ordinary form enough, not very different from that of the Great Eastern as given above. But the two lines mentioned are given a special maximum of 3*d.* per mile for Class A traffic only. The explanation of the anomaly is as follows: The Board of Trade fixed the maximum of this class for these two lines, as for all the other railways dealt with by the Order, at 1·50*d.* for the first twenty miles. When the Order came before the Parliamentary Joint Committee, counsel appeared for the two Liskeard companies and said he was instructed to ask that the Class A rate might be raised to 3*d.* The railways were,

Still, in comparison with the inextricable confusion of the old Acts, the new schedules are a model of simplicity and uniformity. At the same time he would be a bold man who, unless he possessed a considerable knowledge of railway law, railway history, and railway practice, coupled with intimate acquaintance with railway geography, would undertake to say positively the maximum rate legally chargeable, say, from Bridgewater to Grantham, or from Tunbridge to Rochdale. This is, however, not of very great practical importance, for simultaneously with the coming into force of the new schedules, events happened which almost immediately deprived them of the greater portion of whatever importance they might have possessed.

Before proceeding with the history, let us see how the passage of the Rates and Charges Orders affected the then existing rate situation. The rates entered in the station rate-books showed—as they still continue to show—only one inclusive charge. The new maxima are split up into several heads—conveyance

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he said, in the hands of a receiver, as their debenture interest was not being earned; there was practically no traffic except in granite for road-metal from the Caradon quarries, which was being charged 3*d.* per ton per mile; if the rate was reduced to 1½*d.*, the line would not pay its working expenses and the receiver would be forced to close it. The quarry masters appeared as witnesses in support and stated, naturally enough, that a going concern, even with a rate of threepence, was of more use to them than a derelict railway with a nominal maximum of three halfpence. *Solvuntur risu tabulae*, and the Committee made the alteration prayed for. So, on the Liskeard and Caradon, while road-metal pays 3*d.*, 2·65*d.* is the legal maximum charge for coffee and confectionery. The matter is not of much practical importance. But the instance shows the difficulty of applying abstract official formulae to concrete commercial facts.

rate, station terminals (if a station is used by the traffic), service terminals for defined services (if rendered), all of specified amount; and lastly an unspecified sum for external services (collection and delivery, and the like), if actually performed. How does the sum of the new maxima compare with the inclusive rates hitherto in force? The question never was, and in the nature of things could not be, answered with any precision. For, as has been said, there existed no normal mileage scale with which comparison could be made. Individual companies made rough estimates that in certain instances, which were claimed to be typical, particular rates would perforce be reduced by 10, or 15, or 20 per cent., and calculated that the net loss of revenue to them would amount to so many thousand pounds per annum. It was suggested that the total compulsory reduction of charges by all the companies might amount to an annual sum of half a million sterling. This loss appeared in the main to be incurred on quite short-distance traffic, but it also occurred on traffic for considerable distances in the highest classes, and it occurred sporadically in all classes at all distances.

But the new statutory limitation of charging powers left the rates at which the great bulk of the traffic was carried absolutely unaffected. It might—in fact, in some very important cases, coal traffic to London, for instance, it did—cut off all margin for future increase of rates, but it left the existing rates, speaking broadly, undisturbed. Economic forces had long ago brought down the long-distance rates, and had compelled the concession of special rates far below the point at which the new maxima were fixed. And within the limits of the maximum the companies remained as before, free to adjust and vary their rates as they pleased[1]. But the new maximum schedules and the conditions of application attached to them impinged upon the old rates at so many points that the companies found that the only way to insure that all their rates should come within the limits of legality was to withdraw their existing rate-books altogether and recommence with an entirely fresh series.

The task, it need not be said, was tremendous. There are said to be some 7000 stations in the United Kingdom. For each one of the 7000 the legal maximum rate for each class had to be calculated to every other station to which through rates were in force. Then the rates to be actually charged in future had to be worked out, taking into account not only the relation of the different classes to each other, but also the relation between adjacent stations, the equitable claim of traders to the preservation of their acquired situation, and the competitive relation between the customers of the company on different sections of the line on which for historical reasons Parliament had retained two different scales of maximum rates. Further, the whole of the special rates had to be overhauled. In some cases the old special rate might actually be higher than the new class rate. In many other cases the ratio between class rate and special rate was upset. To leave a special rate of 20*s.* for 4-ton lots alongside of a class rate of 20*s.* 3*d.* for 3 cwt. and upwards was obviously absurd. Further, it was natural and proper to take advantage of the new departure to disencumber the rate-book of numbers of special rates, which lapse of time and change of circumstances had rendered obsolete.

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[1] Subject, of course, to the control of the Court of the Railway Commissioners on all questions where undue preference was involved.

The task would have been quite serious enough had each company only had to concern itself with its own railway. But in fact a large proportion of the rates in the rate-book at a big station are through rates to stations on other companies' lines, and such rates are usually available by several different routes. The settlement of a through rate between, say, Limerick and Birmingham affects—and accordingly is submitted for the approval of a Conference representing—not only every important railway company in the three kingdoms, but numerous steamship companies as well. Before the settlement of these rates could be usefully commenced, each company party to them must necessarily have ascertained precisely what its own powers were, and decided at least tentatively what its own local charges would have to be. And it was not only adjustment of rates that had to be undertaken, important questions of principle had to be decided as well. For instance, there was a serious question whether the old system of charging a rate including collection and delivery should be continued, or whether, as in every other country, these extra railway services should be made the subject of a separate charge. If the old system was to be continued, should the companies south of the Thames fall into line with the rest of the country[1]. Naturally, all this took time.

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[1] Here is a problem in a concrete form. There existed for, say, 300 miles, 100 over line *A*, 200 over line *B*, a rate of 44*s*. That rate was divided in the usual manner, 4*s*. to

And the time allowed was quite inadequate. Nine out of the thirty-five Provisional Orders were passed in August, 1891; the remaining twenty-six not till a year later. They were all appointed to come into force on January 1, 1893, and the Board of Trade, which had power to postpone the date, refused the request of the companies that they should do so. The bulk of the work had, therefore, to be done in about five months. And when the first of January came, it had not been done. In most parts of the country the new rate-books contained the class rates only. The old special rates had been cancelled, and no new ones had been entered in their place. Traders, who had been accustomed to pay on certain traffic, say, 12*s.* per ton, received invoices claiming 16*s.*, or 18*s.*, or 20*s.* The company was undoubtedly within its legal rights; there is no obligation to grant a special rate; and the local representatives of the company had no instructions to go outside the letter of their rate-books.

All over the country an outcry arose. Traders by hundreds and thousands refused to pay their monthly accounts. Parliament was appealed to, and representatives of the railways in the House of Commons were unable to make any satisfactory defence. The President

each company for terminal and the balance in proportion to mileage, 12*s.* to *A*, 24*s.* to *B*. Under the new schedule *A*'s maximum powers for the distance are only 15*s.*, while *B*'s for 200 miles are 30*s.* What is to be the new rate? The total of the old rate is covered by the sum of the two companies' powers. Is, then, this rate to be maintained? And if so, how is it to be divided? Is *A* to be given out of it more than its legal maximum? Or is *B* to profit by its neighbour's misfortune? It will hardly be said that the question is so simple as to be capable of an off-hand solution.

of the Board of Trade hastened to promise, in language not often heard from a Cabinet minister speaking officially on behalf of a great Department of State, that the railway companies should 'be brought to their senses.' And yet the railway companies had only attempted to charge the rates which Parliament after ten years of investigation into the question had just enacted as the rates which the companies might 'lawfully charge and make.' The irony of the situation was complete. Personal experience had done in a week what all the writings of 'careful students of the question' could not accomplish in half a century, and had convinced the practical man, whether legislator or trader, that 'fixed maxima are of next to no use in preventing extortion

A Committee of the House of Commons was at once appointed to consider what should be done. Practical men, having proved the difficulty of controlling by legislation a situation essentially economic, were at once ready with proposals for further legislation. It was seriously proposed to give to every county court judge jurisdiction to fix, not merely maximum rates, but the actual rates that were to be charged. For a time it seemed possible that some panic legislation might be passed. The representatives of the railways were called before the Committee and asked to explain their action. The explanations did not entirely agree, as was natural, seeing that the railway councils had notoriously been divided. In some cases want of time appeared to have caused the whole difficulty, and a manager was able to tell the Committee, either that the whole of the old special rates had been restored, or else that they were rapidly being restored, and that traders had been given to understand that their accounts dating back to the first of January would be made out at the old figures. In another case a manager appeared to have desired to test what the traffic would bear; having lost, say, £50 000 of net revenue by the operation of the new maximum schedules, he had sought to find occasion to recoup himself. His new scales of charge would, it was true, if maintained, bring in an additional revenue many times greater than that which he had lost; but he had no hope of maintaining them all. Further eductions would, he admitted, have to be made; but he hoped to end by retaining as much as would cover his losses. On the whole, the explanations failed to satisfy the Committee. In vain the railway companies undertook that no trader should be called on to pay more than a 5 per cent. advance on his old rate. The Committee, it is true, rejected or ignored the more radical proposals that had been submitted to them, but they reported that they failed to see that any increase at all was justified; that the action of the companies had unreasonably disturbed the trade of the country, and that it ought to be placed out of their power to act in a similar manner in the future.

In the following session a Bill to give effect to the recommendations of the Committee was introduced by the Board of Trade, and in due course became law as the Railway and Canal Traffic Act, 1894. By this Act the power of the railway companies to vary their rates as they pleased within the limits of their statutory maxima was for the first time made subject to public control[1]. The Act, which was made retrospective, provided that any trader might complain to the Court of the Railway Commission in reference to any increase of rate made on or at any time after January 1, 1893, and that in any such case the burden should lie upon the railway company of justifying the increase to the satisfaction of the Court. The theory underlying this new legislation was apparently that the power of increase conferred upon the companies by the difference between their old actual charges and the new maxima was given them, not to be used arbitrarily and at once, but to be kept in reserve to meet unforeseen difficulties, a serious and permanent rise in wages or the price of coal or something of that kind. The matter had been left to the discretion of the companies; they were proved, it was thought, to have abused that discretion; it must therefore be withdrawn from them and placed in the hands of an outside tribunal.

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[1] The statement in the text of course omits all reference to undue preference. Ever since 1854—in certain circum-

To the tribunal, however, no indication was given how the discretion was to be exercised. One thing was clear. The presumption was that any given rate was, on January 1, 1903, as high as it reasonably could be. It was for the company, in any case in which objection was taken, to prove that special circumstances justified an increase.

The numerous cases that have, in the course of the last ten years, come before the Court in the main divide

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stances ever since 1845, and in many cases even earlier than that—a trader could complain, not that an increase of rate was in itself oppressive, but that it placed him at an undue disadvantage in comparison with a rival whose rate was left unaltered. But if the Court decided in favour of the contention of trader *A*, the railway company was fully entitled to redress the inequality, not by lowering *A*'s rate, but by making a corresponding increase in the rate charged to *B*.

themselves into two classes. In the first class a company has justified an increase as required to put an end to an anomaly. For instance, flour is carried at Class C rates (which do not include cartage), and on the North-Eastern Railway these rates are fixed on a uniform mileage basis. For very many years it had been the traditional custom in Hull for the railway to collect flour from the mills free, by carts or lighters. Millers in other towns complained that this gave an undue preference to the Hull millers in competition with them. The Court held that it was reasonable to redress the inequality by putting an end to the anachronism and levelling down the services given in return for the rate in one town to the level of all the rest, rather than levelling all the other services up to the level of Hull.

In the second class of case, increases of rate have been defended on the ground of increased cost to the company. Here the decisions seem to establish three propositions as to the attitude of the Court. The increase of cost must not be temporary, but presumably permanent; it must be fairly commensurate with the increase of rate; and it must be incurred in respect of the traffic the rate for which it is proposed to increase. It may well be that an increase of cost shown to apply to the whole of the company's business would justify an increase in certain rates, even though the company refrained from seeking permission to increase other rates. But increased cost of dealing with goods traffic would not apparently justify an increase of coal rates; increased cost of dealing with its traffic in Liverpool would not justify the North-Western in increasing its rates between London and Birmingham.

We are dealing in this book, not with law, but with economics. So we may here note the inconvenience of dealing with economic problems by legal machinery. A law court is not adapted for economic discussion. It can only try definite issues between certain parties according to the established rules of evidence and procedure. It can try the issue 'How much has the cost of carrying coal from *A* to *B* increased in a given time?' And it can decide how much the particular rate should be increased to cover that increased cost. But put the issue this way: 'The cost of carrying coal having been proved to have increased, and it being reasonable that the company should be recouped for its loss of revenue, what traffic shall be selected as best capable of bearing an increased rate, having regard to what is on the whole equitable to that traffic and most in the public interest?' An issue such as this no law court can try. And yet, if the account given in the earlier chapters of this book of the nature of railway business has any truth in it, this is the issue that really should be tried.

Let us test it by imagining a concrete case. Imagine that, owing to foreign competition, the coal export trade of Northumberland and Durham has shrunk to half its present volume. It needs no argument to show that the cost to the North-Eastern Railway of carrying the remaining half will have largely increased. Half the capital invested in staiths and tips, in marshalling yards and storage sidings, in mineral engines and wagons, for dealing with this traffic, will be earning nothing. The general and maintenance expenses will run on with but a small reduction, and being charged on but half the traffic will be double as heavy per unit.

The railway company can clearly make a case for increased rates. 'But,' says a law court, 'the increase must be on export coal. We have no evidence of increased cost on other traffic. The parties who would be affected by increase in other rates are not before the Court, and judgement against them cannot be given in their absence.' We can imagine the answer that would be made by the company, not indeed in the law court, but in the forum of economic discussion: 'We cannot raise the rates on export coal. To do so would be to kill what is left of the traffic. We must be content to carry on this traffic at the present, or perhaps even at lower rates, down to the point where the gross receipts cease to cover our out-of-pocket expenses in doing the business. But you admit we are entitled to raise our rates to recoup ourselves if we can. Give us then leave to double our rates on fifth-class traffic. That can bear the rate. Though it be doubled, not a silk dress, nor an opera-glass, nor a musical-box the fewer will be sold because of it[1].'

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[1] It is worth while to recur once more to the taxation analogy. The expense of Government has increased, and new taxation is requisite. More money is required, say, for elementary education. Would any Chancellor of the Exchequer argue: 'The children to be educated are of the working-classes. I must therefore raise the money by taxes paid mainly by the working-classes, such as those on beer and tobacco'? Would he not rather say that the expenses of Government must be charged where they press least heavily, and increase the stamp duties, or the death duties, or the income tax, if he thought that thereby he attained most nearly to the ideal of equality of sacrifice? And would he not be right?

The point should also be noted that a reduction of the coal tonnage necessarily increases the proportion of the general costs—three-fourths of the whole—of all the remaining traffic.

Fortunately, no such crisis in English industry has yet arisen. But the fact remains that it would be practically impossible for a law court to deal with it on any such lines as we have sketched. Even if the Court were to deal with it, and to be convinced by the argument, it could not give effect to its decision. For before the fifth-class rates could be seriously raised, the maximum rates schedule of the company would have to be repealed by Parliament. Fixed maxima, then, while 'of next to no use in preventing extortion,' may have important influence in preventing economic adjustment.

These, however, are for the present abstract considerations. But a point of serious practical importance remains. The legislation of the years from 1891 to 1894 has done much to prevent any natural and gradual lowering of rates. A railway company is still free to lower. It has ceased to be free to raise. A manager may desire to lower a rate, hoping thereby not only to benefit trade, but also, by increasing largely the volume of traffic, to increase his own net earnings. But it is only a hope. In the nature of the case certainty is not attainable in advance. A prudent manager, therefore, will not, unless his hope is closely allied to certainty, lower a rate when he must face a lawsuit before he can put it up again. Still less will a conference of managers—and most important rates affect many companies—allow one of their number, more sanguine or, it may be, more far-sighted than the rest, to go ahead and make experiments. This, at least, is what we might expect *a priori*. Any trader, whose experience goes back to the years before Parliament began carefully to regulate railway rates in the interest of trade, can say from his own recollection whether the attitude of a railway manager to a suggestion of a reduced rate is nowadays more or less sympathetic than it was thirty years ago[1].

[1] The law of undue preference in the hands of a Court, where legal rather than commercial considerations necessarily rule, has undoubtedly also had weight in putting a stop to the isolated and tentative reductions which, when cumulated, result in a general reduction of the average rate. Hadley (*Railroad Transportation*, p. 250) says of State railway officials: 'They are not occupied with the question how to lower rates, but how to keep the right proportion between existing rates.' The same thing is necessarily true of a railway law court.

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